

January 24, 2002

**MEMORANDUM**

SUBJECT: **Imazalil.** Chemical ID No. 111901. Reregistration Case No. 2325. Revised Acute and Chronic (Non-cancer and Cancer) Dietary Exposure and Risk Analyses for the HED Human Health Risk Assessment. DP Barcode No. D280449.

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**Action Requested**

Provide revised acute and chronic (non-cancer and cancer) dietary exposure and risk analyses for imazalil (111901) uses which are supported through reregistration. The purpose of this revision was to incorporate certain comments from the registrant on the previous dietary exposure analysis, and also to update policy changes which have occurred since the previous dietary exposure analysis (D. Hrdy, 3/23/00, D263160).

**Executive Summary**

- Estimated acute dietary exposure is below HED's level of concern. Use of PDP monitoring data and calculated livestock ARs in the assessment resulted in estimated dietary exposures (99.9<sup>th</sup> percentile) corresponding to 15 % aPAD for Females 13-50 years old.
- Estimated chronic dietary exposure is below HED's level of concern. Use of PDP monitoring data and calculated livestock ARs results in a maximum risk of 3 % of the chronic PAD (% cPAD) for children 1-6, the most highly exposed population subgroup. Dietary risk for the general US population was estimated to be 2 % cPAD.
- Estimated chronic dietary exposure for the general US population is 0.000034 mg/kg/day, based on use of PDP monitoring data and calculated livestock ARs; this exposure corresponds to a lifetime cancer risk estimate of  $2.1 \times 10^{-6}$  for the general US population. HED's level of concern for cancer dietary exposure estimates is  $1.0 \times 10^{-6}$ ; therefore, the estimated cancer risk associated with the use of imazalil exceeds HED's level of concern for the general US population at  $2.1 \times 10^{-6}$ . The Critical Commodity Contribution Analysis indicated that orange and grapefruit food forms were several of the major contributors to the cancer dietary risk estimate accounting for approximately 2/3 of the dietary exposure. In order to understand the impact of assumptions at the exposure estimate, a sensitivity analysis was performed inserting zeroes in place of the ½ LODs for bananas; this resulted in an estimated cancer dietary exposure of 0.000032 mg/kg/day and a lifetime cancer risk estimate of  $1.9 \times 10^{-6}$  for the general US population. Another sensitivity analysis was performed by inserting zero residue values for meat and fat, along with the zeroes in place of the ½ LODs for bananas; this resulted in an estimated cancer dietary exposure of 0.000029 mg/kg/day and a lifetime cancer risk estimate of  $1.8 \times 10^{-6}$  for the general US population. These sensitivity analyses support the conclusion that cancer risk is largely due to imazalil residues in citrus commodities.

## Toxicological Information

Memoranda providing details of relevant toxicological information include the report of the Hazard Identification Assessment Review Committee (Abdallah Khasawinah, 6/29/1999, HED DOC #013539), the report of the FQPA Safety Factor Committee (Brenda Tarplee, 9/28/1999, HED DOC #013762), and the report of the Cancer Assessment Review Committee- Imazalil (Sanjivani Diwan, 12/7/99, HED DOC #013885).

The acute and chronic FQPA safety factor of 10X was reduced to 3X for acute dietary exposure assessment for all population subgroups and retained for the chronic dietary exposure assessment for

all population subgroups (see FQPA Safety Factor Document, 9/13/99). A reference dose (RfD) which includes the FQPA safety factor (10X, 3X or 1X) is defined as the Population Adjusted Dose (PAD). Doses and endpoints for dietary risk assessment are presented in Table 1.

Table 1. Summary of Doses and Endpoints Selected for Imazalil Risk Assessments

EXPOSURE SCENARIO	DOSE (mg/kg/day)	ENDPOINT	STUDY
<b>Acute Dietary</b> Females 13-50 years old  General Population - not relevant	NOAEL=5 UF = 100X <sup>1</sup> FQPA = 3X	Increased resorption and decreased number of fetuses at 10 mg/kg/day	Developmental toxicity study in rabbits
		<b>aPAD = 0.05 mg/kg (Acute RfD)/3 = 0.017 mg/kg/day<sup>2</sup></b>	
<b>Chronic Dietary</b>	NOAEL=2.5 UF = 100X FQPA = 10X	Systemic toxicity: vomiting, soft stools, ↓ body weight gain, ↑ liver weight, ↑ alkaline phosphatase at 20 mg/kg/day	12-month chronic oral study in dogs
		<b>cPAD = 0.025 mg/kg (Chronic RfD)/10 = 0.0025 mg/kg/day</b>	
Cancer Chronic Dietary	$Q_1^* = 6.11 \times 10^{-2}$ (mg/kg/day) <sup>-1</sup>	Hepatocytic neoplasm	Carcinogenicity Study Mice

NOAEL = no observable adverse effects level; LOAEL = lowest observable adverse effects level.

<sup>1</sup> The conventional uncertainty factor of 100X includes 10X for interspecies extrapolation and 10X for intra-species variability.

<sup>2</sup> RfD = NOAEL/UF; PAD = RfD/FQPA SF.

## Consumption Data

Imazalil acute and chronic dietary exposure assessments were conducted using the Dietary Exposure Evaluation Model (DEEM™) software Version 7.75, which incorporates consumption data from USDA's Continuing Surveys of Food Intake by Individuals (CSFII), 1989-1992. The 1989-92 data are based on the reported consumption of more than 10,000 individuals over three consecutive days, and therefore represent more than 30,000 unique "person days" of data. Foods "as consumed" (e.g., apple pie) are linked to raw agricultural commodities and their food forms (e.g., apples-cooked/canned or wheat-flour) by recipe translation files internal to the DEEM software. Consumption data are averaged for the entire US population and within population subgroups for chronic exposure assessment, but are retained as individual consumption events for acute exposure assessment.

For chronic exposure and risk assessment, an estimate of the residue level in each food or food-form (e.g., orange or orange-juice) on the commodity residue list is multiplied by the average daily consumption estimate for that food/food form. The resulting residue consumption estimate for each food/food form is summed with the residue consumption estimates for all other food/food forms on the commodity residue list to arrive at the total estimated exposure. Exposure estimates are expressed in mg/kg body weight/day and as a percent of the cPAD. This procedure is performed for each population subgroup.

For acute exposure assessments, individual one-day food consumption data are used on an individual-by-individual basis. The reported consumption amounts of each food item can be multiplied by a point estimate of residue and summed to obtain a total daily pesticide exposure for a deterministic

(Tier 1 or Tier 2) exposure assessment, or “matched” in multiple random pairings with residue values and then summed in a probabilistic (Tier 3/4) assessment. The resulting distribution of exposures is expressed as a percentage of the aPAD on both a user (i.e., those who reported eating relevant commodities/food forms) and a per-capita (i.e., those who reported eating the relevant commodities as well as those who did not) basis. In accordance with HED policy, per capita exposure and risk are reported for all tiers of analysis. However, particularly for tiers 1 and 2, significant differences in user vs. per capita exposure and risk are identified and noted in the risk assessment.

## Residue Information

The established tolerances for residues of imazalil in/on plant commodities [40 CFR §180.413(a)] are expressed in terms of the combined residues of imazalil and its metabolite R014821 [1-(2,4-dichlorophenyl)-2-(1*H*-imidazole-1-yl)-1-ethanol]. Plant commodity tolerances range from 0.05 ppm (barley grain, cottonseed, and wheat grain) to 10 ppm (citrus fruits). Tolerances are also established for the combined residues of imazalil and R014821 in citrus oil [40 CFR §185.3650] and citrus dried pulp [40 CFR §186.3650], each at 25 ppm. The established tolerances for residues of imazalil in livestock commodities [40 CFR §180.413(b)] are expressed in terms of the combined residues of imazalil and its metabolites R014821 and R042243 [3-[1-(2,4-dichlorophenyl)-2-(1*H*-imidazole-1-yl)ethoxyl]-1,2-propanediol]. Livestock commodity tolerances range from 0.01 ppm (milk and fat, meat, and meat byproducts of cattle, goats, hogs, horses, and sheep) to 0.50 ppm (liver of cattle, goats, hogs, horses, and sheep). No tolerances are established for residues in eggs or poultry tissues. Residues of concern in plants include imazalil and its metabolite R014821. The HED Metabolism Committee (L. Cheng, 8/30/94) concluded that imazalil residues to be regulated in livestock commodities will include imazalil and any metabolite containing the 2,4-dichlorophenyl moiety.

The Biological and Economic Analysis Division (OPP/BEAD) has provided usage information for imazalil (J. Alsadek, 11/5/01). The usage data are provided as Attachment 1; inclusion of the data in dietary exposure analyses is discussed below.

PDP data (1994-1999) reflected analysis for imazalil only (i.e. metabolite residues were not quantified). HED used the PDP data which analyzed for imazalil only and adjusted the residues to account for the additional residues of concern. An adjustment factor was derived from nature of the residue studies in plants submitted by the registrant. Total radioactive residues were less than 0.004 ppm in the wheat metabolism study (L. Cheng, D187506, 1/5/94); therefore, wheat PDP data for parent were used without adjusting for metabolites. Total radioactive residues were less than 0.003 ppm in banana pulp from the banana metabolism study (L. Cheng, D224876, 6/11/96); therefore, banana PDP data for parent were used without adjusting for metabolites. A factor of 1.4 to convert the orange PDP data to account for metabolite R014821 residues in orange pulp was calculated from the nature of the residue study in oranges (L. Cheng, D198235, 4/28/94). The orange pulp TRR data was used since PDP peels the orange samples before analysis. PDP samples of milk were analyzed for imazalil only and showed no detectable residues of parent in 692 samples. Imazalil and residues of the marker metabolites were all <0.06 ppm (LOQ) in milk in the metabolism study (F. Suhre, D182706, 2/16/93). Total imazalil residues after adjusting for marker metabolite concentrations were less than the reported LOQ of 0.06 ppm (0.02 ppm for each compound) in the 5x feeding level of the

ruminant feeding study (S. Piper, D245510, 1/22/99) when normalized to the 1X feeding level. Therefore, milk food forms were considered to be negligible or zero, and were excluded from the dietary exposure analysis. For anticipated residues using PDP data, half the Limit of Detection (LOD) value was a weighted average of all laboratory LODs. Bananas had PDP monitoring data which contained over-tolerance residues. These values were removed in the undecomposed residue distribution file (per HED Dietary Exposure Science Advisory Council policy) since no clear pattern of over-tolerance residues was occurring. In addition, when decompositing the PDP data for bananas over-tolerance values were generated. In accordance with HED policy, these over-tolerance values were “set back” to the tolerance of 0.2 ppm.

For non-blended food forms (NB), single unit residue values were included in the residue distribution file (RDF) for the acute analysis; these single unit residues were statistically generated by way of decomposition of composite PDP residue values using the method described in the H. Allender paper (5/26/99) titled “Statistical Methods for Use of Composite Data in Acute Dietary Risk Assessment.” The number of zeroes and  $\frac{1}{2}$  LODs were adjusted accordingly to preserve the percent of detectable residues found in the original PDP data and to account for the % CT. These numbers were then added into the appropriate RDF and shown in Table 2. For partially blended food forms (PB), the PDP residue distribution was directly incorporated into the RDF with no decomposition. For blended food forms (B), the average residue from composite samples of PDP monitoring data was used as a single point estimate.

For the chronic dietary exposure analyses, a point estimate was used which was the average of the PDP monitoring data where the number of  $\frac{1}{2}$  LODs and zeroes were adjusted according to the average % CT reported by BEAD.

#### *Banana and Plantain*

BEAD estimates 48-52 % CT for bananas from post-harvest treatment. Extensive PDP data are available for bananas which were translated to plantains. Banana non-blended food forms include uncooked, cooked, baked, boiled, and fried. Partially blended food forms include canned and juice. Blended food forms include dried bananas. For non-blended food forms (NB), single unit residue values were included in the RDF; these single unit residues were generated via decomposition of composite PDP residue values. For partially blended food forms (PB), the PDP residue distribution was directly incorporated into the RDF with no decomposition. For blended food forms (B), the average of composite PDP monitoring data was used as a single point estimate. There were 1126 samples of bananas with 150 detects. Three of these detects were over-tolerance and were removed from the data set leaving 1123 samples with 147 detects.

RAC	#Detects/#Sampled	% Detects	$\frac{1}{2}$ LOD(ppm) weighted average	Total of Detects (ppm)
Banana	147/1123	13.1	0.017	8.721

## Citrus

The BEAD estimates % CT of 18-22 % for fresh oranges and 2-6 % overall for oranges, 46-50 % for limes, 43-47 % for grapefruit, and 26-30 % for fresh lemons and 20-24 % for stored lemons. The registered use is post-harvest treatment. Extensive PDP data are available for oranges and orange juice, which were translated to other citrus fruits. Adjustment factor 1 in DEEM™ for citrus juices and citrus juice concentrates was adjusted due to translation from orange juice per Dietary Exposure Science Advisory Council policy (see table below). Citrus non-blended (NB) food forms include peeled fruit-uncooked and cooked. Citrus partially blended (PB) food forms include peel-all food forms, peeled fruit-canned, juice, and juice concentrate. There were 1892 samples of oranges with 1056 detects and 1377 samples of orange juice with 55 detects. The % CT provided by BEAD was not used for fresh oranges since the detectable residues in the PDP data constituted 56 % of the total samples. The % CT used for orange juice was 6 % /4 % for the acute and chronic dietary exposure analyses, respectively. The % CT used for lime juice was 50 % /48 % for the acute and chronic dietary exposure analyses, respectively. The % CT used for lemon juice was 24 % /22 % for the acute and chronic dietary exposure analyses, respectively. The % CT used for grapefruit juice was 22 % /21 % for the acute and chronic dietary exposure analyses, respectively. The % CT used for tangerine juice was 26 % /24 % for the acute and chronic dietary exposure analyses, respectively.

Modified Processing Factor for Citrus Juices For Use When Monitoring Data From Orange Juice Is Available.

commodity	DEEM Default PF <sup>c</sup>	Modified PF <sup>a</sup>
Orange Juice	1.8	1.00
Orange Juice-conc	6.7	3.72
Lime Juice	2	1.11
Lime Juice Concentrate	6	3.33
Lemon Juice	2	1.11
Lemon Juice-conc	11.4	6.33 <sup>b</sup>
Grapefruit juice	2.1	1.17
Grapefruit juice-conc	8.26	4.58
Tangerine Juice	2.3	1.28
Tangerine Juice-conc	7.35	4.08

<sup>a</sup> Note: Since PDP reconstitutes their juice concentrate samples before analysis. DEEM assumes consumption of the concentrate; therefore, a concentration factor must be applied to citrus concentrates. The modified processing factor shown in the third column of the table adjusts for the PDP orange juice residues being translated to all other citrus juices and their concentrates.

<sup>b</sup> Sample Calculation: Lemon Juice DEEM PF/ OJ DEEM PF \* Lemon Juice concentrate DEEM PF/Lemon Juice DEEM PF = Modified PF for Lemon Juice Concentrate:  $(2/1.8) * (11.4/2) = 6.33x$

<sup>c</sup> The DEEM default PF accounts for concentration from the raw agricultural commodity to the processed commodity.

RAC	#Detects/#Sampled	% Detects	$\frac{1}{2}$ LOD (ppm) weighted average	Total of Detects (ppm)
Oranges	1056/1892	55.8	0.025	137.311
Orange Juice	55/1377	4.0	0.03	3.635

## Wheat

Extensive PDP data are available for wheat which was translated to barley since use patterns are similar. All food forms of wheat are considered blended (B); therefore, an average residue was calculated from the PDP data. BEAD provided an estimate of 4 % CT for the average and a high end estimate of 5 % CT for wheat from seed treatment (only registered use). BEAD provided an estimate of 1 % CT for the average and a high end estimate of 2 % CT for barley from seed treatment (only registered use). There were 1483 samples of wheat with 21 detects.

RAC	#Detects/#Sampled	% Detects	$\frac{1}{2}$ LOD (ppm) weighted average	Total of Detects (ppm)
Wheat	21/1483	1.4	0.003	0.261

#### *Meat, Milk, Poultry, and Eggs*

Extensive PDP data are available for milk only. Milk and all 11 livestock tissue food forms are considered partially blended. There were 692 samples of milk tested with no detects. The upper bound % CT assumption (50 %) for milk came from the livestock feed item in the dietary burden (lime citrus pulp) with the greatest % CT. HED has made a determination to not require tolerances for imazalil residues of concern in eggs and poultry tissues since there is no reasonable expectation of finite residues [40 CFR §180.6(a)(3)]. This determination is based on a review of a poultry feeding (DP barcode D254805, D. Hrdy, 1/19/00.) There is no reasonable expectation of finding quantifiable imazalil residues in meat and fat of hogs (D263159, D. Hrdy, 3/23/00). Therefore, anticipated residues were calculated for muscle, liver, kidney, and meat-by-products for cattle, goats, horses, and sheep only. The ARs were calculated using the imazalil and marker metabolite residues from the ruminant feeding studies (S. Piper, D245510, 1/22/99) and adjusting to account for all residues of concern. RDFS were generated using the respective AR along with the same number of zeroes due to the 50 % CT used. For the chronic dietary exposure analyses, 48 % CT was used along with the average tissue AR.

RAC	#Detects/#Sampled	% Detects	$\frac{1}{2}$ LOD (ppm) weighted average	Total of Detects (ppm)
Milk	0/692	0	0.002	0

Table 2. Livestock Dietary Burden.

Feed Item	Anticipated Residue	% Dry Matter	% Livestock Diet	Dietary Contribution
<b>Beef</b>				
citrus pulp, dried	16.7	91	15	2.75
protein source (soybean)	na	na	20	0
wheat forage	0.5	25	25	0.50

wheat straw	0.5	88	10	0.06
wheat grain	0.1	89	20	0.02
<b>Total</b>				<b>3.33</b>
<b>Dairy</b>				
citrus pulp, dried	16.7	91	15	2.75
protein source (soybean)	na	na	20	0
wheat forage	0.5	25	40	0.80
wheat straw	0.5	88	10	0.06
wheat grain	0.1	89	15	0.02
<b>Total</b>				<b>3.63</b>

Table 3. Cattle Anticipated Residues (S. Piper, D245510, 1/22/99).

Feeding Level	Tissue	Total imazalil residues normalized to 1x feeding level	Imazalil residues adjusted to account for 2,4-dichlorophenyl metabolites	Average Anticipated Residue
330 ppm (98X)	<b>Muscle</b>	0.199/98 = 0.002 ppm	0.002/0.72 = 0.003 ppm	<b>0.005 ppm</b>
	<b>Liver</b>	14.683/98 = 0.150 ppm	0.150/0.44 = 0.341 ppm	<b>0.28 ppm</b>
	<b>Kidney</b>	3.827/98 = 0.039 ppm	0.039/0.71 = 0.055 ppm	<b>0.036 ppm</b>

	<b>Fat</b>	0.350/98 = 0.004 ppm	0.004/0.33 = 0.012 ppm	<b>0.009 ppm</b>
99 ppm (29X)	Muscle	0.077/29 = 0.003 ppm	0.003/0.72 = 0.004 ppm	
	Liver	3.713/29 = 0.128 ppm	0.128/0.44 = 0.291 ppm	
	Kidney	0.628/29 = 0.022 ppm	0.022/0.71 = 0.031 ppm	
	Fat	0.067/29 = 0.002 ppm	0.002/0.33 = 0.006 ppm	
33 ppm (10X)	Muscle	0.050/10 = 0.005 ppm	0.005/0.72 = 0.007 ppm	
	Liver	0.956/10 = 0.096 ppm	0.096/0.44 = 0.218 ppm	
	Kidney	0.155/10 = 0.016 ppm	0.016/0.71 = 0.023 ppm	
	Fat	0.026/10 = 0.003 ppm	0.003/0.33 = 0.009 ppm	

Table 4. Summary of Anticipated Residues for Imazalil.

Commodity/Reassessed Tolerance (ppm)	% Crop Treated	Data Source <sup>a</sup>	Commodity Classification <sup>b</sup>	Food Forms	Acute Residue Distribution File (RDF) <sup>c,d</sup>	A (
Bananas/0.2	48-52	PDP	NB	Uncooked, cooked, baked, boiled, fried	1000NZ, 2910@0.017, 3609Z	N
			PB	Canned, juice	147NZ, 437@0.017, 539Z	N
			B	Dried	NA	C
Oranges/10	Fresh oranges 18-22 Overall 2-6  6 % acute (juice) 4 % chronic (juice)	PDP (Oranges)	NB	Peeled fruit-uncooked, cooked	1000NZ, 0@0.025, 786Z	N
			PB	Peel/, Peeled fruit-canned	1056NZ, 0@0.025, 836Z	N

			PB	Juice/Juice concentrate	55NZ, 28@0.03, 1294Z	NA	0.003*
Limes/10	46-50 50 % acute (juice) 48 % chronic (juice)	PDP (Oranges)	NB	Peeled fruit-uncooked, cooked	1000NZ, 0@0.025, 786Z	NA	0.073*
			PB	Peel/, Peeled fruit-canned	1056NZ, 0@0.025, 836Z	NA	0.073*
			PB	Juice/Juice concentrate	55NZ, 634@0.03, 688Z	NA	0.016*
Grapefruit/10	43-47 22 % acute (juice) 21 % chronic (juice)	PDP (Oranges)	NB	Peeled fruit-uncooked, cooked	1000NZ, 0@0.025, 786Z	NA	0.073*
			PB	Peel/, Peeled fruit-canned	1056NZ, 0@0.025, 836Z	NA	0.073*
			PB	Juice/Juice concentrate	55NZ, 592@0.03, 730Z	NA	0.008*
Lemons/10	Fresh lemons 26-30 Pre-storage 20-24  24 % acute (juice) 22 % chronic (juice)	PDP (Oranges)	NB	Peeled fruit-uncooked, cooked	1000NZ, 0@0.025, 786Z	NA	0.073*
			PB	Peel/, Peeled fruit-canned	1056NZ, 0@0.025, 836Z	NA	0.073*
			PB	Juice/Juice concentrate	55NZ, 358@0.03, 964Z	NA	0.008*
Tangerines/10	22-26 26 % acute (juice) 24 % chronic (juice)	PDP (Oranges)	NB	Uncooked	1000NZ, 0@0.025, 786Z		0.073*
			PB	Canned, frozen	1056NZ, 0@0.025, 836Z		0.073*
			PB	Juice/Juice concentrate	55NZ, 303@0.03, 1019Z		0.009*
Wheat/0.05	3-5	PDP	B	All food forms	NA	0.0003*	0.0003*
Barley/0.05	1-2	PDP (Wheat)	B	All food forms	NA	0.0002*	0.0002*
Goat Liver, Goat Meat byproducts, Goat other organ meats, Sheep Liver, Sheep Meat byproducts, Sheep other organ meats, Beef & Veal Meat byproducts, Beef & Veal other organ meats, Beef & Veal Liver/0.2	50% <sup>e</sup>	FT	NB	All food forms	1NZ, 1Z	NA	0.28
Goat Kidney, Sheep kidney, Beef & Veal kidney/0.2	50% <sup>e</sup>	FT	NB	All food forms	1NZ, 1Z	NA	0.036

Goat Muscle and fat, Sheep muscle and fat, Beef & Veal muscle and fat/0.05	50% <sup>e</sup>	FT	NB	All food forms	1NZ, 1Z	NA	0.005 muscle 0.009 fat
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<sup>a</sup>PDP = USDA Pesticide Data Program, FT = Field Trials

<sup>b</sup>NB = not blended, PB = partially blended, B = blended

<sup>c</sup>NZ = non zeroes, Z = zeroes, X @ 0.00X = # samples assumed to have residues at the weighted average  $\frac{1}{2}$  LOD

<sup>d</sup>NA = not applicable

<sup>e</sup>%crop treated calculated into anticipated residue.

<sup>f</sup>Percent crop treated for livestock tissues is derived from the highest % CT of any of the feed items used in the calculation of the dietary burden, in this case, lime citrus pulp.

## Uncertainties

The dietary exposure analyses is a highly refined Tier 3 assessment since % CT and PDP monitoring data were used in the analyses. Imazalil is used as a post-harvest treatment on citrus and banana. The Critical Commodity Contribution Analysis indicated that orange and grapefruit food forms were several of the major contributors to the cancer dietary risk estimate accounting for approximately 2/3 of the cancer dietary exposure. Therefore, due to the post-harvest use on citrus no more significant decline of residues (beyond washing done by PDP prior to analysis) would be expected.

The analytical method used by USDA in data collection analyzes for imazalil *per se*; therefore, an adjustment factor of 1.4 (for the metabolite R014821) was derived from the orange nature of the residue study. This adjustment factor was translated to all citrus. Use patterns are similar for all citrus. Percent crop treated data were used for bananas, citrus juices, and livestock tissues. The BEAD reported % CT data for citrus was less than the percent detectable residues in the PDP data, therefore, the PDP data were used "as is" without adjusting for % crop treated. There were three detects in the PDP banana data which were over the tolerance. These values were removed in the undecomposed residue distribution file (per HED Dietary Exposure Science Advisory Council policy) since no clear pattern of

over-tolerance residues was occurring. Upon decomposing, there were a number of over-tolerance values generated in the decomposed residue distribution file. These over-tolerance values were “set back” to the tolerance per HED policy. PDP data for oranges were translated to lemon, lime, grapefruit, tangelo, and tangerine. PDP data for orange juice were translated to all citrus and adjusted for % CT for the respective commodity. PDP data for banana were translated to plantain. PDP data for wheat were translated to barley. PDP analyzed 692 milk samples for imazalil in 1996, 1997, and 1998. No detectable imazalil residues were found. Total imazalil residues after adjusting for marker metabolite concentrations were less than the reported LOQ of 0.06 ppm (0.02 ppm for each compound) in the 5x feeding level of the ruminant feeding study when normalized to the 1X feeding level. Therefore, milk food forms were considered to be negligible or zero, and were excluded from the dietary exposure analysis.

HED notes that there is a degree of uncertainty in extrapolating exposures for certain population subgroups which may not be sufficiently represented in the consumption surveys, (e.g., nursing and non-nursing infants or Hispanic females). Therefore, risks estimated for these population subgroups were included in representative populations having sufficient numbers of survey respondents (e.g., all infants or females, 13-50 years).

## **Results/Discussion**

Estimated acute dietary exposure is below HED’s level of concern. Use of PDP monitoring data and calculated livestock ARs in the assessment resulted in estimated dietary exposures (99.9<sup>th</sup> percentile) corresponding to 15 % aPAD for Females 13-50 years old (Table 5).

Estimated chronic dietary exposure is below HED’s level of concern. Use of PDP monitoring data and calculated livestock ARs results in a maximum risk of 3 % of the chronic PAD (% cPAD) for children 1-6. Dietary risk for the general US population was estimated to be 1 % cPAD. (Table 6).

Estimated chronic dietary exposure for the general US population is 0.000034 mg/kg/day, based on use of PDP monitoring data and calculated livestock ARs; this exposure corresponds to a lifetime cancer risk estimate of  $2.1 \times 10^{-6}$  for the general US population. HED’s level of concern for cancer dietary exposure estimates is  $1.0 \times 10^{-6}$ ; therefore, the estimated cancer risk associated with the use of imazalil exceeds HED’s level of concern for the general US population at  $2.1 \times 10^{-6}$ . The Critical Commodity Contribution Analysis indicated that orange and grapefruit food forms were several of the major contributors to the cancer dietary risk estimate accounting for approximately 2/3 of the dietary exposure. In order to understand the impact of assumptions at the exposure estimate, a sensitivity analysis was performed inserting zeroes in place of the ½ LODs for bananas; this resulted

in an estimated cancer dietary exposure of 0.000032 mg/kg/day and a lifetime cancer risk estimate of  $1.9 \times 10^{-6}$  for the general US population. Another sensitivity analysis was performed by inserting zero residue values for meat and fat, along with the zeroes in place of the  $\frac{1}{2}$  LODs for bananas; this resulted in an estimated cancer dietary exposure of 0.000029 mg/kg/day and a lifetime cancer risk estimate of  $1.8 \times 10^{-6}$  for the general US population. These sensitivity analyses support the conclusion that cancer risk is largely due to imazalil residues in citrus commodities

Table 5. Estimated Acute Dietary Exposure/Risk.

Population Subgroup	Acute <b>(Probabilistic)</b> (99.9th %-ile)		Acute <b>(Probabilistic)</b> (99th %-ile)		Acute <b>(Probabilistic)</b> (95th %-ile)	
	Exposure (mg/kg/day)	% aPAD	Exposure (mg/kg/day)	% aPAD	Exposure (mg/kg/day)	% aPAD
Females (13-50 years)	0.002503	15	0.000449	3	0.000070	<1

Table 6. Estimated Chronic Dietary Exposure/Risk

Population Subgroup	Chronic	
	Exposure (mg/kg/day)	% cPAD
U.S. Population	0.000034	1
All infants (<1 year)	0.000028	1
Children (1-6 years)	0.000069	3
Children (7-12 years)	0.000048	2
Females (13-50 years)	0.000026	1
Males (13-19 years)	0.000024	1
Males (20+ years)	0.000026	1
Seniors (55+ years)	0.000037	1

Table 7. Estimated Cancer Dietary Exposure/Risk

	Exposure (mg/kg/day)	Lifetime Risk

U.S. Population	0.000034	$2.1 \times 10^{-6}$
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cc : Chem F, Chron F, Morton , L. Richardson

RDI:Dietary Exposure SAC; (S. Kinard 1/24/02 & C. Swartz 1/24/02); SVH:1/24/02

TM, Thurston Morton, Rm. 816D CM2, 305-6691, mail code 7509C

#### List of Attachments:

- Attachment 1: Quantitative Usage Analysis, 1/00 (J. Alsadek, BEAD/OPP).
- Attachment 2: Residue Distribution Files for Probabilistic Analysis.
- Attachment 3: Residue Information.
- Attachment 4: Acute Analysis.
- Attachment 5: Chronic (Non-Cancer) Analysis.
- Attachment 6: Chronic (Cancer) Analysis.
- Attachment 7: Acute Critical Exposure Contribution Analysis.
- Attachment 8: Chronic Critical Commodity Contribution Analysis.
- Attachment 9: Cancer Critical Commodity Contribution Analysis.

**Attachment 1: Quantitative Usage Analysis, 11/5/01 (J. Alsadek, BEAD/OPP).**  
**Postharvest Imazalil Percent Crop Treated**

Crop	# of Applications	% of Fresh Crop Ttd	% of Crop Ttd	Lbs. of Crop Ttd*10 <sup>3</sup>	Lbs. of AI Used
<b>Oranges</b>	1 Postharvest	18-22 <sup>1</sup>	2-6	900,000-1100,000	1,900-2,100
<b>Tangerines</b>	1 Postharvest	-	22-26	120,000-140,000	250-325
<b>Grapefruit</b>	1 Postharvest	43-47	20-22	700,000-800,000	1,450-1,650
<b>Lemons</b>	1 No-storage* 1 Pre-storage 1 Post-storage	- - -	26-30 20-24 1-3	500,000-550,000 400,000-450,000	900-1,100 780-900 75-85
<b>Limes</b>	1 Postharvest	-	46-50	8,500-10,000	18-22
<b>Bananas</b>	1 Postharvest	-	48-52	5,500-7,000	12-16
<b>Barley</b>	1 Seed Treatment	-	1-2	-	-
<b>Wheat</b>	1 Seed Treatment	-	3-5	-	-
<b>Total</b>				2,634,000-3,057,000	5,385-6,198

Based on EPA Proprietary Data, 1994-95, and crop profiles for barley and hard red spring and durum wheat in North Dakota, December, 2000.

\* According to Dr. Glazener of Kevric, a certain amount of citrus fruit does not go into storage, but is shipped to market directly. Some of these fruits received a treatment but did not go into storage.

Jihad Alsadek  
January 19, 2000  
Revisited, November 5, 2001

**Attachment 2: Residue Distribution Files for Probabilistic Analysis.**

doc BANANAS PDP %CPTX=52

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TOTALZ=539	0.05	0.022	0.065
TOTALLOD=4	0.05	0.022	0.065
37	0.05	0.022	0.065
LODRES=0.0	0.05	0.042	0.07
17	0.05	0.045	0.07
0.015	0.05	0.045	0.07
0.015	0.05	0.045	0.07
0.015	0.05	0.045	0.072
0.015	0.05	0.045	0.085
0.015	0.05	0.045	0.086
0.015	0.05	0.045	0.09
0.015	0.05	0.049	0.09
0.015	0.065	0.05	0.096
0.015	0.065	0.05	0.13
0.015	0.07	0.05	0.14
0.015	0.07	0.05	0.17
0.015	0.07	0.05	0.18
0.015	0.07	0.05	
0.015	0.07	0.05	
0.033	0.07	0.05	doc
0.049	0.07	0.05	decomposit
0.049	0.07	0.05	ed BANANAS
0.05	0.07	0.05	PDP
0.05	0.07	0.05	%CPTX=52
0.05	0.097	0.05	TOTALZ=360
0.05	0.099	0.05	9
0.05	0.11	0.05	TOTALLOD=2
0.05	0.12	0.05	910
0.05	0.17	0.05	LODRES=0.0
0.05	0.19	0.05	17
0.05	0.2	0.05	0.007
0.05	0.012	0.05	0.163
0.05	0.013	0.05	0.028
0.05	0.015	0.05	0.009
0.05	0.015	0.05	0.001
0.05	0.015	0.05	0.20
0.05	0.015	0.05	0.003
0.05	0.015	0.05	0.046
0.05	0.015	0.05	0.001
0.05	0.015	0.05	0.009
0.05	0.015	0.05	0.017
0.05	0.015	0.05	0.009
0.05	0.015	0.05	0.067
0.05	0.015	0.055	0.014
0.05	0.016	0.057	0.012

0.016	0.088	0.002	0.100
0.003	0.019	0.053	0.013
0.106	0.066	0.023	0.019
0.075	0.096	0.006	0.018
0.086	0.015	0.027	0.020
0.010	0.010	0.011	0.016
0.001	0.003	0.073	0.20
0.016	0.047	0.003	0.068
0.033	0.053	0.104	0.037
0.064	0.037	0.009	0.007
0.005	0.002	0.015	0.097
0.023	0.046	0.025	0.087
0.006	0.018	0.048	0.023
0.009	0.021	0.016	0.003
0.050	0.002	0.001	0.009
0.003	0.045	0.044	0.003
0.017	0.019	0.198	0.021
0.012	0.044	0.004	0.007
0.022	0.170	0.003	0.115
0.058	0.022	0.001	0.004
0.050	0.014	0.030	0.047
0.014	0.180	0.006	0.006
0.030	0.063	0.092	0.025
0.003	0.034	0.008	0.008
0.012	0.20	0.20	0.010
0.000	0.026	0.20	0.043
0.002	0.20	0.013	0.017
0.063	0.002	0.055	0.005
0.005	0.035	0.005	0.005
0.20	0.001	0.075	0.008
0.043	0.057	0.20	0.019
0.012	0.112	0.002	0.079
0.068	0.027	0.003	0.038
0.20	0.029	0.002	0.003
0.004	0.024	0.007	0.028
0.142	0.012	0.137	0.006
0.20	0.035	0.030	0.174
0.025	0.016	0.001	0.003
0.006	0.131	0.057	0.002
0.031	0.004	0.124	0.001
0.051	0.037	0.001	0.019
0.008	0.009	0.114	0.20
0.187	0.007	0.003	0.102
0.082	0.048	0.060	0.003
0.006	0.012	0.001	0.005

0.005	0.002	0.004	0.019
0.20	0.082	0.002	0.028
0.000	0.005	0.008	0.002
0.141	0.005	0.070	0.006
0.022	0.018	0.20	0.037
0.011	0.010	0.034	0.011
0.071	0.001	0.015	0.012
0.006	0.012	0.023	0.033
0.001	0.192	0.012	0.023
0.002	0.20	0.043	0.005
0.040	0.014	0.014	0.008
0.078	0.007	0.021	0.150
0.028	0.004	0.017	0.005
0.008	0.011	0.016	0.041
0.039	0.018	0.014	0.004
0.014	0.026	0.002	0.003
0.016	0.041	0.20	0.040
0.051	0.005	0.145	0.007
0.073	0.005	0.017	0.008
0.059	0.004	0.050	0.004
0.008	0.009	0.056	0.004
0.069	0.20	0.001	0.072
0.004	0.015	0.021	0.120
0.007	0.024	0.046	0.010
0.004	0.019	0.006	0.20
0.20	0.010	0.031	0.147
0.007	0.20	0.016	0.027
0.20	0.005	0.20	0.091
0.066	0.031	0.033	0.003
0.041	0.009	0.108	0.009
0.013	0.014	0.002	0.001
0.021	0.024	0.009	0.159
0.126	0.20	0.016	0.026
0.064	0.032	0.109	0.020
0.026	0.006	0.034	0.017
0.045	0.049	0.018	0.011
0.018	0.011	0.080	0.011
0.010	0.117	0.001	0.038
0.008	0.002	0.035	0.032
0.093	0.047	0.062	0.155
0.009	0.031	0.20	0.013
0.20	0.021	0.168	0.132
0.084	0.013	0.014	0.004
0.004	0.020	0.000	0.129
0.002	0.029	0.005	0.020

0.011	0.036	0.027	0.015
0.008	0.011	0.020	0.027
0.061	0.032	0.086	0.003
0.013	0.021	0.118	0.017
0.009	0.005	0.008	0.007
0.042	0.003	0.012	0.036
0.015	0.032	0.013	0.047
0.013	0.060	0.007	0.003
0.002	0.039	0.038	0.005
0.007	0.002	0.083	0.20
0.022	0.001	0.036	0.124
0.055	0.080	0.008	0.003
0.027	0.013	0.006	0.003
0.136	0.014	0.010	0.069
0.007	0.105	0.018	0.002
0.039	0.065	0.033	0.043
0.006	0.002	0.025	0.20
0.001	0.184	0.049	0.20
0.003	0.024	0.010	0.120
0.003	0.015	0.20	0.003
0.010	0.003	0.040	0.008
0.089	0.20	0.004	0.002
0.036	0.006	0.042	0.031
0.006	0.20	0.034	0.006
0.076	0.004	0.003	0.005
0.054	0.101	0.053	0.059
0.018	0.098	0.044	0.013
0.010	0.015	0.008	0.004
0.029	0.004	0.011	0.007
0.012	0.159	0.002	0.002
0.022	0.001	0.022	0.057
0.026	0.023	0.007	0.025
0.006	0.017	0.004	0.020
0.058	0.123	0.005	0.041
0.074	0.029	0.017	0.029
0.095	0.011	0.002	0.086
0.20	0.004	0.026	0.005
0.015	0.025	0.020	0.039
0.010	0.030	0.194	0.022
0.011	0.029	0.012	0.002
0.007	0.055	0.046	0.097
0.052	0.020	0.032	0.012
0.024	0.026	0.032	0.020
0.006	0.007	0.027	0.080
0.20	0.061	0.019	0.023

0.028	0.166	0.010	0.001
0.016	0.005	0.034	0.003
0.018	0.011	0.021	0.031
0.021	0.049	0.012	0.079
0.109	0.014	0.055	0.088
0.063	0.023	0.002	0.20
0.004	0.017	0.009	0.040
0.092	0.000	0.016	0.056
0.041	0.007	0.002	0.009
0.057	0.003	0.015	0.152
0.004	0.029	0.007	0.038
0.024	0.007	0.045	0.021
0.002	0.023	0.008	0.002
0.038	0.020	0.20	0.011
0.008	0.126	0.003	0.004
0.011	0.010	0.014	0.016
0.006	0.022	0.030	0.007
0.072	0.20	0.015	0.001
0.002	0.044	0.013	0.20
0.019	0.009	0.006	0.060
0.20	0.006	0.113	0.091
0.041	0.042	0.016	0.005
0.006	0.011	0.155	0.095
0.20	0.013	0.009	0.070
0.037	0.030	0.002	0.115
0.028	0.031	0.010	0.20
0.002	0.002	0.008	0.007
0.010	0.006	0.008	0.035
0.016	0.014	0.005	0.005
0.112	0.002	0.004	0.074
0.090	0.035	0.129	0.024
0.082	0.040	0.022	0.001
0.034	0.015	0.029	0.088
0.008	0.20	0.022	0.071
0.016	0.027	0.199	0.000
0.004	0.017	0.093	0.142
0.008	0.013	0.040	0.012
0.182	0.010	0.033	0.009
0.012	0.033	0.20	0.012
0.017	0.025	0.007	0.076
0.010	0.083	0.013	0.016
0.037	0.017	0.178	0.001
0.008	0.029	0.006	0.010
0.050	0.010	0.011	0.017
0.018	0.019	0.003	0.006

0.069	0.013	0.026	0.014
0.025	0.066	0.20	0.20
0.020	0.141	0.010	0.024
0.101	0.048	0.019	0.003
0.003	0.004	0.007	0.001
0.006	0.20	0.033	0.20
0.008	0.002	0.010	0.003
0.077	0.001	0.156	0.048
0.047	0.054	0.008	0.010
0.003	0.013	0.116	0.025
0.132	0.009	0.007	0.003
0.009	0.011	0.059	0.026
0.20	0.005	0.002	0.118
0.005	0.004	0.002	0.029
0.052	0.050	0.20	0.022
0.004	0.011	0.006	0.028
0.109	0.039	0.060	0.006
0.085	0.006	0.008	0.067
0.007	0.010	0.054	0.001
0.017	0.005	0.021	0.030
0.002	0.013	0.065	0.001
0.005	0.058	0.032	0.018
0.056	0.035	0.024	0.084
0.006	0.036	0.003	0.001
0.20	0.053	0.20	0.012
0.044	0.000	0.020	0.014
0.014	0.072	0.016	0.034
0.145	0.038	0.025	0.005
0.20	0.008	0.20	0.026
0.026	0.023	0.021	0.081
0.100	0.051	0.032	0.043
0.162	0.004	0.068	0.073
0.018	0.011	0.20	0.007
0.000	0.076	0.064	0.002
0.004	0.015	0.022	0.014
0.122	0.003	0.004	0.042
0.062	0.020	0.049	0.005
0.009	0.20	0.027	0.002
0.015	0.006	0.009	0.018
0.012	0.018	0.001	0.013
0.104	0.058	0.035	0.107
0.054	0.015	0.019	0.149
0.015	0.004	0.134	0.024
0.037	0.045	0.062	0.001
0.014	0.005	0.021	0.017

0.043	0.003	TOTALZ=836	0.05
0.169	0.094	TOTALLOD=0	0.052
0.001	0.009	LODRES=0.0	0.055
0.138	0.20	25	0.06
0.051	0.004	0.015	0.061
0.052	0.20	0.015	0.062
0.001	0.102	0.017	0.063
0.164	0.018	0.017	0.064
0.011	0.001	0.017	0.065
0.019	0.009	0.017	0.065
0.007	0.174	0.017	0.065
0.001	0.014	0.017	0.065
0.012	0.013	0.017	0.065
0.013	0.005	0.017	0.065
0.026	0.044	0.017	0.065
0.008	0.039	0.017	0.065
0.003	0.003	0.017	0.065
0.130	0.004	0.017	0.065
0.009	0.050	0.017	0.065
0.003	0.004	0.017	0.065
0.075	0.011	0.017	0.065
0.20	0.021	0.032	0.065
0.005	0.042	0.034	0.065
0.046	0.20	0.034	0.065
0.031	0.011	0.035	0.065
0.185	0.028	0.036	0.067
0.033	0.064	0.047	0.067
0.066	0.035	0.048	0.067
0.081	0.007	0.05	0.067
0.004	0.038	0.05	0.067
0.012	0.004	0.05	0.067
0.018	0.004	0.05	0.067
0.001	0.008	0.05	0.067
0.016	0.20	0.05	0.067
0.001	0.028	0.05	0.067
0.024	0.007	0.05	0.067
0.105	0.005	0.05	0.067
0.030	0.099	0.05	0.067
0.010	0.061	0.05	0.067
0.006	0.008	0.05	0.067
0.023		0.05	0.067
0.048	doc	0.05	0.067
0.006	ORANGES	0.05	0.067
0.003	PDP	0.05	0.067
0.005	%CPTX=22	0.05	0.067

0.067	0.092	0.15	0.23
0.067	0.092	0.15	0.23
0.067	0.092	0.15	0.24
0.067	0.092	0.15	0.24
0.067	0.092	0.15	0.25
0.067	0.092	0.15	0.25
0.067	0.092	0.15	0.25
0.074	0.092	0.16	0.25
0.077	0.092	0.16	0.25
0.082	0.094	0.16	0.25
0.09	0.095	0.16	0.25
0.09	0.1	0.16	0.25
0.09	0.1	0.17	0.25
0.09	0.1	0.17	0.25
0.091	0.1	0.17	0.25
0.092	0.1	0.17	0.25
0.092	0.1	0.17	0.25
0.092	0.11	0.17	0.25
0.092	0.11	0.17	0.25
0.092	0.11	0.17	0.26
0.092	0.11	0.17	0.26
0.092	0.11	0.17	0.27
0.092	0.11	0.18	0.27
0.092	0.11	0.18	0.27
0.092	0.11	0.18	0.27
0.092	0.11	0.18	0.28
0.092	0.12	0.18	0.28
0.092	0.12	0.18	0.28
0.092	0.12	0.19	0.29
0.092	0.12	0.19	0.29
0.092	0.12	0.2	0.29
0.092	0.13	0.2	0.29
0.092	0.13	0.2	0.3
0.092	0.13	0.2	0.3
0.092	0.13	0.2	0.3
0.092	0.13	0.2	0.31
0.092	0.13	0.2	0.31
0.092	0.14	0.21	0.32
0.092	0.14	0.21	0.32
0.092	0.14	0.22	0.32
0.092	0.14	0.22	0.32
0.092	0.14	0.22	0.33
0.092	0.14	0.22	0.33
0.092	0.14	0.22	0.33
0.092	0.15	0.22	0.33

0.34	0.015	0.038	0.05
0.34	0.015	0.038	0.05
0.34	0.015	0.039	0.05
0.34	0.015	0.039	0.05
0.34	0.015	0.041	0.05
0.35	0.015	0.041	0.05
0.35	0.015	0.042	0.05
0.35	0.015	0.042	0.05
0.35	0.015	0.042	0.05
0.39	0.015	0.042	0.05
0.39	0.015	0.043	0.05
0.39	0.015	0.044	0.05
0.4	0.015	0.044	0.05
0.4	0.015	0.045	0.051
0.42	0.015	0.045	0.051
0.43	0.015	0.047	0.051
0.43	0.015	0.047	0.051
0.44	0.015	0.049	0.052
0.45	0.015	0.05	0.053
0.48	0.015	0.05	0.053
0.54	0.015	0.05	0.054
0.55	0.015	0.05	0.055
0.56	0.015	0.05	0.056
0.56	0.024	0.05	0.057
0.58	0.025	0.05	0.059
0.63	0.025	0.05	0.059
0.63	0.025	0.05	0.062
0.68	0.026	0.05	0.062
0.73	0.027	0.05	0.062
0.81	0.031	0.05	0.063
0.85	0.032	0.05	0.063
0.96	0.032	0.05	0.063
1	0.033	0.05	0.063
1.1	0.034	0.05	0.064
0.011	0.034	0.05	0.064
0.012	0.035	0.05	0.064
0.012	0.035	0.05	0.064
0.012	0.035	0.05	0.064
0.015	0.036	0.05	0.065
0.015	0.036	0.05	0.065
0.015	0.037	0.05	0.065
0.015	0.037	0.05	0.065
0.015	0.038	0.05	0.065
0.015	0.038	0.05	0.065

0.065	0.078	0.09	0.13
0.065	0.084	0.09	0.13
0.065	0.085	0.09	0.13
0.065	0.088	0.09	0.13
0.065	0.088	0.09	0.13
0.065	0.09	0.09	0.14
0.065	0.09	0.09	0.14
0.065	0.09	0.09	0.14
0.065	0.09	0.09	0.14
0.065	0.09	0.09	0.14
0.065	0.09	0.09	0.14
0.065	0.09	0.09	0.14
0.065	0.09	0.09	0.14
0.065	0.09	0.09	0.14
0.065	0.09	0.09	0.14
0.065	0.09	0.09	0.15
0.065	0.09	0.09	0.15
0.065	0.09	0.09	0.15
0.065	0.09	0.09	0.15
0.065	0.09	0.09	0.15
0.065	0.09	0.091	0.15
0.065	0.09	0.091	0.15
0.065	0.09	0.092	0.15
0.065	0.09	0.094	0.15
0.065	0.09	0.095	0.16
0.065	0.09	0.095	0.16
0.066	0.09	0.099	0.16
0.066	0.09	0.1	0.16
0.067	0.09	0.1	0.16
0.067	0.09	0.1	0.16
0.067	0.09	0.1	0.16
0.067	0.09	0.103	0.16
0.067	0.09	0.11	0.16
0.068	0.09	0.11	0.16
0.068	0.09	0.11	0.16
0.069	0.09	0.12	0.16
0.07	0.09	0.12	0.16
0.07	0.09	0.12	0.16
0.071	0.09	0.12	0.16
0.071	0.09	0.12	0.17
0.071	0.09	0.12	0.17
0.072	0.09	0.12	0.17
0.073	0.09	0.12	0.17
0.075	0.09	0.12	0.17
0.075	0.09	0.12	0.18
0.076	0.09	0.12	0.18
0.077	0.09	0.13	0.18
0.078	0.09	0.13	0.18

0.18	0.33	0.015	0.05
0.18	0.34	0.015	0.05
0.19	0.34	0.015	0.05
0.19	0.35	0.015	0.05
0.19	0.35	0.015	0.05
0.19	0.36	0.015	0.05
0.2	0.37	0.015	0.05
0.2	0.37	0.015	0.05
0.2	0.37	0.015	0.05
0.2	0.38	0.015	0.05
0.2	0.38	0.015	0.05
0.2	0.38	0.02	0.05
0.2	0.38	0.021	0.05
0.2	0.38	0.021	0.05
0.2	0.4	0.021	0.05
0.2	0.41	0.022	0.05
0.21	0.44	0.024	0.05
0.21	0.45	0.025	0.05
0.21	0.45	0.026	0.05
0.21	0.49	0.027	0.05
0.22	0.5	0.027	0.05
0.22	0.52	0.029	0.05
0.23	0.56	0.03	0.05
0.23	0.6	0.03	0.05
0.23	0.61	0.03	0.05
0.23	0.012	0.031	0.05
0.24	0.012	0.031	0.05
0.24	0.012	0.031	0.05
0.24	0.012	0.033	0.05
0.24	0.012	0.034	0.05
0.24	0.012	0.036	0.05
0.25	0.012	0.036	0.05
0.25	0.012	0.037	0.05
0.25	0.012	0.039	0.05
0.25	0.015	0.04	0.05
0.25	0.015	0.04	0.05
0.27	0.015	0.041	0.05
0.28	0.015	0.041	0.05
0.28	0.015	0.043	0.05
0.28	0.015	0.044	0.05
0.28	0.015	0.044	0.05
0.3	0.015	0.045	0.05
0.31	0.015	0.049	0.05
0.31	0.015	0.05	0.05
0.32	0.015	0.05	0.05

0.05	0.06	0.09	0.12
0.05	0.06	0.09	0.12
0.05	0.061	0.09	0.12
0.05	0.061	0.09	0.12
0.05	0.064	0.09	0.12
0.05	0.064	0.09	0.12
0.05	0.065	0.09	0.13
0.05	0.066	0.09	0.13
0.05	0.066	0.09	0.13
0.05	0.068	0.09	0.13
0.05	0.068	0.09	0.13
0.05	0.069	0.09	0.13
0.05	0.07	0.09	0.13
0.05	0.07	0.094	0.13
0.05	0.07	0.095	0.14
0.05	0.07	0.097	0.14
0.05	0.07	0.097	0.14
0.05	0.071	0.099	0.14
0.05	0.072	0.099	0.14
0.05	0.072	0.099	0.14
0.05	0.074	0.1	0.14
0.05	0.075	0.1	0.14
0.05	0.075	0.1	0.14
0.05	0.076	0.1	0.14
0.05	0.076	0.1	0.15
0.05	0.076	0.11	0.15
0.05	0.077	0.11	0.15
0.05	0.078	0.11	0.15
0.05	0.078	0.11	0.15
0.05	0.078	0.11	0.15
0.05	0.079	0.11	0.15
0.05	0.079	0.11	0.15
0.051	0.082	0.11	0.15
0.051	0.084	0.11	0.15
0.051	0.085	0.11	0.15
0.053	0.086	0.11	0.16
0.053	0.087	0.11	0.16
0.056	0.09	0.12	0.16
0.056	0.09	0.12	0.16
0.056	0.09	0.12	0.16
0.057	0.09	0.12	0.16
0.058	0.09	0.12	0.16
0.059	0.09	0.12	0.16
0.059	0.09	0.12	0.16

0.17	0.27	0.020	0.014
0.17	0.27	0.033	0.009
0.17	0.27	0.138	0.010
0.17	0.28	0.192	0.036
0.17	0.29	0.011	0.007
0.17	0.29	0.056	0.792
0.18	0.29	0.033	0.083
0.18	0.3	0.047	0.093
0.18	0.3	0.025	0.135
0.18	0.3	0.006	0.053
0.18	0.31	0.085	0.002
0.19	0.32	0.001	0.300
0.19	0.34	0.015	0.005
0.19	0.37	0.107	0.024
0.19	0.38	0.131	0.064
0.19	0.39	0.074	0.018
0.19	0.41	0.026	0.065
0.19	0.44	0.655	0.025
0.19	0.48	0.030	0.013
0.19	0.5	0.014	0.027
0.19	0.52	3.862	0.031
0.2	0.57	0.042	0.042
0.2	0.59	0.066	0.017
0.2	0.64	0.032	0.036
0.2	0.74	0.232	0.045
0.2		0.009	0.118
0.2	doc	0.007	0.008
0.2	DECOMPOSIT	0.013	0.114
0.21	ED ORANGES	0.203	0.029
0.21	PDP PARENT	3.287	0.003
0.22	ONLY	0.306	0.119
0.22	%CPTX=22	0.093	0.007
0.22	TOTALZ=786	0.709	0.396
0.22	TOTALLOD=0	0.121	0.019
0.23	LODRES=0.0	0.005	0.205
0.23	25	0.058	0.040
0.24	0.287	0.124	0.034
0.24	0.021	0.059	0.023
0.25	0.018	0.001	0.046
0.26	0.090	0.019	0.005
0.26	0.037	0.017	0.080
0.26	0.017	0.051	0.037
0.26	0.071	0.005	0.054
0.26	0.047	0.040	0.020
0.26	0.035	0.924	0.094

0.003	0.041	0.037	0.013
0.448	0.390	0.034	0.021
0.019	0.028	0.028	0.055
0.009	0.021	0.157	0.006
0.160	0.054	0.082	0.002
0.052	0.013	0.002	0.017
0.023	0.068	0.244	0.079
0.014	0.038	0.016	0.077
0.009	0.137	0.020	0.057
0.007	0.031	0.021	0.067
0.029	0.151	0.075	0.103
0.229	0.000	0.267	0.072
0.004	0.034	0.010	0.031
0.012	0.262	0.173	0.186
0.170	0.130	0.049	0.604
0.053	0.044	0.008	0.016
0.573	0.040	0.224	0.012
0.068	0.058	0.007	0.002
0.016	0.075	0.080	0.374
0.070	0.033	0.037	0.009
0.004	0.016	0.026	0.011
0.539	1.243	0.049	0.015
0.004	0.003	0.241	0.001
0.446	0.048	0.006	0.002
0.045	0.006	0.024	1.116
0.005	0.091	0.140	0.005
0.330	0.018	0.107	1.622
0.030	0.043	0.006	0.044
0.123	0.251	1.025	0.694
0.129	0.128	0.143	0.016
0.041	0.101	0.218	1.718
0.004	0.865	0.525	0.003
0.016	0.072	0.033	0.020
0.096	0.009	0.005	0.011
0.012	0.212	0.010	0.155
0.141	0.010	0.003	0.195
0.062	0.095	0.078	0.004
0.002	0.025	0.180	0.052
0.565	0.043	0.050	0.061
0.032	0.008	0.027	0.017
0.115	0.001	2.107	0.070
0.326	0.015	0.026	0.019
0.035	0.039	0.087	0.200
0.147	0.007	0.017	0.023
0.004	0.018	0.012	0.006

0.249	0.003	0.069	0.014
0.050	1.377	0.048	0.009
0.024	0.023	0.515	0.006
0.018	0.022	1.105	0.209
0.004	0.048	0.026	0.038
0.038	0.066	0.023	0.165
0.008	0.007	0.010	0.005
0.046	0.003	0.145	0.029
0.002	0.008	0.279	0.257
0.002	0.039	0.073	0.076
0.051	0.191	0.003	0.154
0.113	0.059	0.038	0.018
0.109	0.051	0.007	0.036
0.004	0.035	0.001	0.313
0.031	0.148	0.090	0.022
0.098	0.004	0.102	0.010
0.014	0.030	0.022	0.321
0.055	0.116	0.021	0.040
0.018	0.006	0.620	0.166
0.060	0.003	0.083	0.024
0.041	0.006	0.086	0.057
0.001	0.019	0.021	0.111
0.088	0.014	0.851	0.032
0.011	0.025	0.012	0.346
0.082	0.109	0.088	0.197
0.182	0.014	0.011	0.031
0.002	0.092	0.012	0.046
0.221	0.098	0.063	0.104
0.063	0.366	0.159	0.343
0.024	0.028	0.014	0.011
0.489	0.013	0.162	0.010
0.009	0.003	0.005	0.285
0.001	0.007	0.170	0.059
0.015	0.351	0.009	0.070
0.008	0.015	0.026	0.025
0.127	0.408	0.085	0.015
0.006	0.186	0.002	0.003
0.061	0.008	0.056	0.423
0.006	0.001	0.020	0.028
0.012	0.011	0.027	0.100
0.117	0.125	0.042	0.238
0.011	0.005	0.099	0.004
0.001	0.045	0.064	0.081
0.178	0.382	0.150	0.105
0.012	0.029	0.133	0.022

0.008	0.017	0.168	0.030
0.054	0.064	0.047	0.051
0.009	0.097	0.010	0.062
0.110	0.074	0.124	0.107
0.425	0.005	0.081	0.002
0.297	0.019	0.131	0.006
0.175	0.031	0.016	0.066
0.027	0.026	0.115	0.041
0.010	0.120	0.010	0.010
0.008	0.001	0.005	0.026
0.007	0.004	0.468	0.712
0.001	0.001	0.059	0.022
0.077	0.012	0.045	0.128
0.005	1.449	0.295	3.521
0.010	0.004	0.016	0.061
0.035	0.182	0.002	0.011
0.022	0.071	0.034	0.002
0.030	0.006	0.170	0.013
0.217	0.003	0.032	0.023
0.067	0.039	0.096	0.015
0.269	0.030	0.075	0.003
0.047	0.382	0.043	0.496
0.004	0.215	0.031	0.009
0.061	0.450	0.041	0.044
0.002	0.001	1.709	0.214
0.003	0.008	0.047	0.136
0.479	0.148	0.184	0.024
0.043	0.004	0.035	0.084
0.472	0.738	0.485	0.174
0.019	0.062	0.034	0.089
0.005	0.090	0.000	0.003
0.011	0.008	0.002	0.129
0.028	0.398	0.020	0.037
0.015	0.255	0.017	0.058
0.743	0.827	0.033	0.684
0.015	0.029	0.004	0.056
0.013	0.006	0.007	0.003
0.020	0.003	0.300	0.082
0.274	0.076	0.140	0.007
0.013	0.024	0.142	0.005
0.004	0.423	0.265	1.079
0.011	0.008	0.009	0.083
0.011	0.132	0.444	0.023
0.059	0.027	0.112	0.025
0.194	0.149	0.004	0.008

0.599	0.105	0.009	0.023
0.254	0.226	0.020	0.359
0.118	0.095	0.006	0.044
0.023	0.018	0.661	0.073
0.016	0.007	0.019	0.019
0.022	0.517	0.043	0.071
0.063	0.061	0.024	0.028
1.242	0.040	0.036	0.067
0.014	0.051	0.092	0.103
0.018	0.053	0.020	0.031
0.016	0.003	0.025	0.055
0.000	0.043	0.019	0.013
0.325	0.007	0.197	0.433
0.041	0.056	0.153	0.100
0.005	0.110	0.006	0.018
1.159	0.086	0.015	0.075
0.011	0.046	0.019	0.291
0.781	0.037	0.035	0.004
0.022	0.007	0.005	0.011
0.032	0.023	0.010	0.003
0.026	0.086	0.014	0.012
0.029	0.009	0.005	0.025
0.007	0.002	0.060	0.015
0.004	0.003	0.045	0.022
1.656	0.014	0.006	0.018
0.187	0.028	0.004	0.013
0.002	0.033	0.242	0.357
0.368	0.018	0.055	0.167
0.012	0.021	0.077	0.003
2.312	0.002	0.247	0.221
0.576	0.088	0.010	0.387
0.029	0.015	0.008	0.014
0.009	0.065	0.008	0.190
0.542	0.005	0.015	0.066
0.001	0.047	0.085	0.049
0.041	0.009	0.038	0.005
0.013	0.030	0.011	0.003
0.020	0.020	0.028	0.006
0.021	0.014	0.007	0.038
0.017	0.079	0.013	0.121
0.048	0.012	0.999	0.007
0.032	0.035	0.049	0.017
0.011	0.022	0.006	0.039
0.054	0.042	0.057	0.006
0.008	0.032	0.055	0.081

0.238	0.287	0.095	0.116
0.018	0.070	0.142	0.021
0.123	0.017	0.052	0.155
0.007	0.017	0.013	0.091
0.009	0.068	0.042	0.108
0.045	0.230	0.138	0.030
0.022	0.200	0.002	0.152
0.094	0.040	0.176	0.013
0.158	0.031	0.058	0.619
4.617	0.046	0.049	0.087
0.205	0.001	0.106	0.052
0.015	0.002	0.009	0.102
0.114	0.069	0.021	0.104
0.002	0.005	0.001	0.012
0.038	0.024	0.016	0.057
0.135	0.341	0.026	0.065
0.945	0.078	0.233	0.051
0.333	0.027	0.101	0.005
0.013	0.069	0.180	0.219
0.043	0.080	0.050	0.871
0.558	0.038	0.029	0.015
0.027	0.002	0.034	0.271
0.243	0.001	0.059	0.144
0.005	0.315	0.126	0.005
0.178	0.036	0.163	0.281
0.004	0.009	0.003	0.050
0.019	0.307	0.054	0.010
0.001	0.127	0.012	0.026
0.011	0.064	0.014	0.157
0.093	0.048	0.319	0.089
0.004	0.003	0.037	0.110
0.259	0.350	0.007	0.001
0.003	0.006	0.008	0.518
0.166	0.017	0.274	0.025
0.072	0.016	0.011	0.406
0.029	0.024	0.099	0.007
0.028	0.033	0.012	0.010
0.133	0.027	0.160	0.117
0.053	0.025	0.068	0.204
0.036	0.099	0.016	0.035
0.079	0.211	0.146	0.033
0.021	0.020	0.004	0.076
0.113	0.009	0.036	0.073
0.193	0.010	0.046	0.010
0.014	0.065	0.014	0.008

0.040	0.017	0.05	%CPTX=50
	0.017	0.05	TOTALZ=688
doc	0.017	0.05	TOTALLOD=6
GRAPEFRUIT	0.017	0.05	34
JUICE PDP	0.017	0.05	LODRES=0.0
%CPTX=22	0.017	0.05	3
TOTALZ=107	0.041	0.058	0.017
4	0.047	0.063	0.017
TOTALLOD=2	0.048	0.063	0.017
48	0.05	0.11	0.017
LODRES=0.0	0.05	0.11	0.017
3	0.05	0.11	0.05
0.017	0.05	0.13	0.05
0.017	0.05	0.14	0.05
0.017	0.05	0.15	0.05
0.017	0.05	0.16	0.05
0.017	0.05	0.17	0.05
0.05	0.05	0.17	0.05
0.05	0.05	0.2	0.05
0.05	0.061	0.25	0.05
0.05	0.067	0.017	0.05
0.05	0.1	0.017	0.05
0.05		0.017	0.05
0.05	doc LEMON	0.017	0.05
0.05	JUICE PDP	0.017	0.05
0.05	%CPTX=24	0.017	0.058
0.05	TOTALZ=104	0.041	0.063
0.05	7	0.047	0.063
0.05	TOTALLOD=2	0.048	0.11
0.05	75	0.05	0.11
0.05	LODRES=0.0	0.05	0.11
0.058	3	0.05	0.13
0.063	0.017	0.05	0.14
0.063	0.017	0.05	0.15
0.11	0.017	0.05	0.16
0.11	0.017	0.05	0.17
0.11	0.017	0.05	0.17
0.13	0.05	0.05	0.2
0.14	0.05	0.05	0.25
0.15	0.05	0.061	0.017
0.16	0.05	0.067	0.017
0.17	0.05	0.1	0.017
0.17	0.05		0.017
0.2	0.05	doc LIME	0.017
0.25	0.05	JUICE PDP	0.017

0.041	0.058	LODRES=0.0	0.05
0.047	0.063	3	0.05
0.048	0.063	0.017	0.05
0.05	0.11	0.017	0.05
0.05	0.11	0.017	0.05
0.05	0.11	0.017	0.05
0.05	0.13	0.017	0.05
0.05	0.14	0.05	0.05
0.05	0.15	0.05	0.05
0.05	0.16	0.05	0.061
0.05	0.17	0.05	0.067
0.05	0.17	0.05	0.1
0.05	0.2	0.05	
0.061	0.25	0.05	Documentat
0.067	0.017	0.05	ion:doc
0.1	0.017	0.05	beef fat
	0.017	0.05	imazalil
doc ORANGE	0.017	0.05	DOC
JUICE PDP	0.017	0.05	ASSUMING
%CPTX=22	0.017	0.05	50% CROP
TOTALZ=129	0.041	0.05	TREATED IN
4	0.047	0.058	DIETARY
TOTALLOD=2	0.048	0.063	BURDEN
8	0.05	0.063	TOTALNZ=1
LODRES=0.0	0.05	0.11	TOTALZ=1
3	0.05	0.11	0.009
0.017	0.05	0.11	
0.017	0.05	0.13	Documentat
0.017	0.05	0.14	ion:doc
0.017	0.05	0.15	beef
0.017	0.05	0.16	kidney
0.05	0.05	0.17	imazalil
0.05	0.05	0.17	DOC
0.05	0.061	0.2	ASSUMING
0.05	0.067	0.25	50% CROP
0.05	0.1	0.017	TREATED IN
0.05		0.017	DIETARY
0.05	doc	0.017	BURDEN
0.05	TANGERINE	0.017	TOTALNZ=1
0.05	JUICE PDP	0.017	TOTALZ=1
0.05	%CPTX=50	0.017	0.036
0.05	TOTALZ=101	0.041	
0.05	9	0.047	Documentat
0.05	TOTALLOD=3	0.048	ion:doc
0.05	03	0.05	beef liver

imazalil  
DOC  
ASSUMING  
50% CROP  
TREATED IN  
DIETARY  
BURDEN  
TOTALNZ=1  
TOTALZ=1  
0.28

Documentat  
ion:doc  
beef  
muscle  
imazalil  
DOC  
ASSUMING  
50% CROP  
TREATED IN  
DIETARY  
BURDEN  
TOTALNZ=1  
TOTALZ=1  
0.005

doc MILK  
PDP  
%CPTX(LIME  
S)=50  
TOTALZ=50  
TOTALFREQ=  
1

50, 0.002

### **Attachment 3: Residue Information.**

#### Acute Analysis

Filename: C:\deem\111901\111901revacute.RS7 Chemical:  
Imazalil  
RfD(Chronic): .0025 mg/kg bw/day NOEL(Chronic): 2.5 mg/kg bw/day  
RfD(Acute): .017 mg/kg bw/day NOEL(Acute): 5 mg/kg bw/day Q\*= .0611  
Date created/last modified: 11-06-2001/07:59:43/8 Program ver. 7.7  
Comment: this is a file for all the commodities with a pdp data, percent cr  
treated values and rdf files.  
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RDL indices and parameters for Monte Carlo Analysis:

Index	Dist	Parameter #1	Param #2	Param #3
-------	------	--------------	----------	----------

# Code

1	6	bananas.rdf
2	6	decbananas.rdf
3	6	orange.rdf
4	6	decoranges.rdf
5	6	orangejuice.rdf
6	6	milk.rdf
7	6	beeffat.rdf
8	6	beefkid.rdf
9	6	beefliver.rdf
10	6	beefmuscle.rdf
11	6	grapefruitjuice.rdf
12	6	lemonjuice.rdf
13	6	limejuice.rdf
14	6	tangerinejuice.rdf

Food	Crop	Food Name	Def Res (ppm)	Adj.Factors #1	Adj.Factors #2	RDL Pntr
	Code	Grp				
72	O	Bananas				
		11-Uncooked	0.014000	1.000	1.000	2
		12-Cooked: NFS	0.014000	1.000	1.000	2
		13-Baked	0.014000	1.000	1.000	2
		14-Boiled	0.014000	1.000	1.000	2
		15-Fried	0.014000	1.000	1.000	2
		31-Canned: NFS	0.014000	1.000	1.000	1
		32-Canned: Cooked	0.014000	1.000	1.000	1
73	O	Bananas-dried	0.014000	3.900	1.000	1
378	O	Bananas-juice	0.014000	1.000	1.000	1

265	15	Barley	0.000200	1.000	1.000	
323	M	Beef-dried	0.005000	1.920	1.000	10
324	M	Beef-fat w/o bones	0.004000	1.000	1.000	7
325	M	Beef-kidney	0.036000	1.000	1.000	8
327	M	Beef-lean (fat/free) w/o bones	0.005000	1.000	1.000	10
326	M	Beef-liver	0.180000	1.000	1.000	9
321	M	Beef-meat byproducts	0.180000	1.000	1.000	9
322	M	Beef-other organ meats	0.180000	1.000	1.000	9
20	10	Citrus citron	0.073000	1.000	1.400	3
330	M	Goat-fat w/o bone	0.004000	1.000	1.000	7
331	M	Goat-kidney	0.036000	1.000	1.000	8
333	M	Goat-lean (fat/free) w/o bone	0.005000	1.000	1.000	10
332	M	Goat-liver	0.180000	1.000	1.000	9
328	M	Goat-meat byproducts	0.180000	1.000	1.000	9
329	M	Goat-other organ meats	0.180000	1.000	1.000	9
23	10	Grapefruit-juice	0.014000	1.170	1.400	11
441	10	Grapefruit-juice-concentrate	0.014000	4.580	1.400	11
448	10	Grapefruit-peel	0.073000	1.000	1.400	3
22	10	Grapefruit-peeled fruit				
		11-Uncooked	0.073000	1.000	1.400	4
		12-Cooked: NFS	0.073000	1.000	1.400	4
		14-Boiled	0.073000	1.000	1.400	3
		31-Canned: NFS	0.073000	1.000	1.400	3
334	M	Horsemeat	0.005000	1.000	1.000	10
24	10	Kumquats	0.073000	1.000	1.400	3
28	10	Lemons-juice	0.007000	1.110	1.400	12
442	10	Lemons-juice-concentrate	0.007000	6.330	1.400	12
27	10	Lemons-peel	0.073000	1.000	1.400	3
26	10	Lemons-peeled fruit				
		11-Uncooked	0.073000	1.000	1.400	4
		12-Cooked: NFS	0.073000	1.000	1.400	4
		31-Canned: NFS	0.073000	1.000	1.400	3
32	10	Limes-juice	0.015000	1.110	1.400	13
443	10	Limes-juice-concentrate	0.015000	3.330	1.400	13
31	10	Limes-peel	0.073000	1.000	1.400	3
30	10	Limes-peeled fruit				
		11-Uncooked	0.073000	1.000	1.400	4
		12-Cooked: NFS	0.073000	1.000	1.400	4
		31-Canned: NFS	0.073000	1.000	1.400	3
36	10	Oranges-juice	0.003000	1.000	1.400	5
33	10	Oranges-juice-concentrate	0.003000	3.720	1.400	5
35	10	Oranges-peel	0.073000	1.000	1.400	3
34	10	Oranges-peeled fruit				
		11-Uncooked	0.073000	1.000	1.400	4
		12-Cooked: NFS	0.073000	1.000	1.400	4
		31-Canned: NFS	0.073000	1.000	1.400	3
480	O	Plantains-green				

		15-Fried	0.014000	1.000	1.000	2
94 O	Plantains-ripe					
	11-Uncooked	0.014000	1.000	1.000	2	
	14-Boiled	0.014000	1.000	1.000	2	
	15-Fried	0.014000	1.000	1.000	2	
481 O	Plantains-dried	0.014000	3.900	1.000	1	
338 M	Sheep-fat w/o bone	0.004000	1.000	1.000	7	
339 M	Sheep-kidney	0.036000	1.000	1.000	8	
341 M	Sheep-lean (fat free) w/o bone	0.005000	1.000	1.000	10	
340 M	Sheep-liver	0.180000	1.000	1.000	9	
336 M	Sheep-meat byproducts	0.180000	1.000	1.000	9	
337 M	Sheep-other organ meats	0.180000	1.000	1.000	9	
37 10	Tangelos	0.073000	1.000	1.400	4	
38 10	Tangerines					
	11-Uncooked	0.073000	1.000	1.400	4	
	31-Canned: NFS	0.073000	1.000	1.400	3	
	41-Frozen: NFS	0.073000	1.000	1.400	3	
39 10	Tangerines-juice	0.008000	1.280	1.400	14	
420 10	Tangerines-juice-concentrate	0.008000	4.080	1.400	14	
429 M	Veal-dried	0.004000	1.920	1.000	10	
424 M	Veal-fat w/o bones	0.004000	1.000	1.000	7	
426 M	Veal-kidney	0.036000	1.000	1.000	8	
425 M	Veal-lean (fat free) w/o bones	0.005000	1.000	1.000	10	
427 M	Veal-liver	0.180000	1.000	1.000	9	
430 M	Veal-meat byproducts	0.180000	1.000	1.000	9	
428 M	Veal-other organ meats	0.180000	1.000	1.000	9	
278 15	Wheat-bran	0.000300	1.000	1.000		
279 15	Wheat-flour	0.000300	1.000	1.000		
277 15	Wheat-germ	0.000300	1.000	1.000		
437 15	Wheat-germ oil	0.000300	1.000	1.000		
276 15	Wheat-rough	0.000300	1.000	1.000		

### Chronic Analysis

Filename: C:\deem\111901\111901revchronic.RS7 Chemical:  
Imazalil  
RfD(Chronic): .0025 mg/kg bw/day NOEL(Chronic): 2.5 mg/kg bw/day  
RfD(Acute): .017 mg/kg bw/day NOEL(Acute): 5 mg/kg bw/day Q\*= .0611  
Date created/last modified: 11-13-2001/10:05:14/8 Program ver. 7.7  
Comment: this is a file for all the commodities with a pdp data, percent cr  
treated values and rdf files.

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RDL indices and parameters for Monte Carlo Analysis:  

Index	Dist	Parameter #1	Param #2	Param #3
#	Code			
1	6	bananas.rdf		
2	6	decbananas.rdf		
3	6	orange.rdf		
4	6	decoranges.rdf		
5	6	orangejuice.rdf		
6	6	milk.rdf		
7	6	beeffat.rdf		
8	6	beefkid.rdf		
9	6	beefliver.rdf		
10	6	beefmuscle.rdf		
11	6	grapefruitjuice.rdf		
12	6	lemonjuice.rdf		
13	6	limejuice.rdf		
14	6	tangerinejuice.rdf		

Note: No residue distributions have been assigned to RAC/FoodForms below

Food	Crop		Def Res	Adj.Factors	
Code	Grp	Food Name	(ppm)	#1	#2
72	O	Bananas			
73	O	Bananas-dried	0.014000	3.900	1.000
378	O	Bananas-juice	0.014000	1.000	1.000
265	15	Barley	0.000200	1.000	1.000
323	M	Beef-dried	0.005000	1.920	0.480
324	M	Beef-fat w/o bones	0.009000	1.000	0.480
325	M	Beef-kidney	0.036000	1.000	0.480
327	M	Beef-lean (fat/free) w/o bones	0.005000	1.000	0.480

326	M	Beef-liver	0.280000	1.000	0.480
321	M	Beef-meat byproducts	0.280000	1.000	0.480
322	M	Beef-other organ meats	0.280000	1.000	0.480
20	10	Citrus citron	0.073000	1.000	1.400
330	M	Goat-fat w/o bone	0.009000	1.000	0.480
331	M	Goat-kidney	0.036000	1.000	0.480
333	M	Goat-lean (fat/free) w/o bone	0.005000	1.000	0.480
332	M	Goat-liver	0.280000	1.000	0.480
328	M	Goat-meat byproducts	0.280000	1.000	0.480
329	M	Goat-other organ meats	0.280000	1.000	0.480
23	10	Grapefruit-juice	0.008000	1.170	1.400
441	10	Grapefruit-juice-concentrate	0.008000	4.580	1.400
448	10	Grapefruit-peel	0.073000	1.000	1.400
22	10	Grapefruit-peeled fruit			
334	M	Horsemeat	0.005000	1.000	0.480
24	10	Kumquats	0.073000	1.000	1.400
28	10	Lemons-juice	0.008000	1.110	1.400
442	10	Lemons-juice-concentrate	0.008000	6.330	1.400
27	10	Lemons-peel	0.073000	1.000	1.400
26	10	Lemons-peeled fruit			
32	10	Limes-juice	0.016000	1.110	1.400
443	10	Limes-juice-concentrate	0.015000	3.330	1.400
31	10	Limes-peel	0.073000	1.000	1.400
30	10	Limes-peeled fruit			
36	10	Oranges-juice	0.003000	1.000	1.400
33	10	Oranges-juice-concentrate	0.003000	3.720	1.400
35	10	Oranges-peel	0.073000	1.000	1.400
34	10	Oranges-peeled fruit			
480	O	Plantains-green			
94	O	Plantains-ripe			
481	O	Plantains-dried	0.014000	3.900	1.000
338	M	Sheep-fat w/o bone	0.009000	1.000	0.480
339	M	Sheep-kidney	0.036000	1.000	0.480
341	M	Sheep-lean (fat free) w/o bone	0.005000	1.000	0.480
340	M	Sheep-liver	0.280000	1.000	0.480
336	M	Sheep-meat byproducts	0.280000	1.000	0.480
337	M	Sheep-other organ meats	0.280000	1.000	0.480
37	10	Tangelos	0.073000	1.000	1.400
38	10	Tangerines			
39	10	Tangerines-juice	0.009000	1.280	1.400
420	10	Tangerines-juice-concentrate	0.009000	4.080	1.400
429	M	Veal-dried	0.005000	1.920	0.480
424	M	Veal-fat w/o bones	0.009000	1.000	0.480
426	M	Veal-kidney	0.036000	1.000	0.480
425	M	Veal-lean (fat free) w/o bones	0.005000	1.000	0.480

427	M	Veal-liver	0.280000	1.000	0.480
430	M	Veal-meat byproducts	0.280000	1.000	0.480
428	M	Veal-other organ meats	0.280000	1.000	0.480
278	15	Wheat-bran	0.000300	1.000	1.000
279	15	Wheat-flour	0.000300	1.000	1.000
277	15	Wheat-germ	0.000300	1.000	1.000
437	15	Wheat-germ oil	0.000300	1.000	1.000
276	15	Wheat-rough	0.000300	1.000	1.000

### Cancer Analysis

Filename: C:\deem\111901\111901revcancer.RS7 Chemical:  
Imazalil  
RfD(Chronic): .0025 mg/kg bw/day NOEL(Chronic): 2.5 mg/kg bw/day  
RfD(Acute): .017 mg/kg bw/day NOEL(Acute): 5 mg/kg bw/day Q\*= .0611  
Date created/last modified: 11-08-2001/08:09:05/8 Program ver. 7.7  
Comment: this is a file for all the commodities with a pdp data, percent cr  
treated values and rdf files.

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RDL indices and parameters for Monte Carlo Analysis:  
Index Dist Parameter #1 Param #2 Param #3  
# Code  
-----  
1 6 bananas.rdf  
2 6 decbananas.rdf  
3 6 orange.rdf  
4 6 decoranges.rdf  
5 6 orangejuice.rdf  
6 6 milk.rdf  
7 6 beeffat.rdf  
8 6 beefkid.rdf  
9 6 beefliver.rdf  
10 6 beefmuscle.rdf  
11 6 grapefruitjuice.rdf  
12 6 lemonjuice.rdf  
13 6 limejuice.rdf  
14 6 tangerinejuice.rdf

Note: No residue distributions have been assigned to RAC/FoodForms below

Food	Crop		Def Res	Adj. Factors	
Code	Grp	Food Name	(ppm)	#1	#2
72	O	Bananas			
73	O	Bananas-dried	0.014000	3.900	1.000
378	O	Bananas-juice	0.014000	1.000	1.000
265	15	Barley	0.000200	1.000	1.000
323	M	Beef-dried	0.005000	1.920	0.480

324	M	Beef-fat w/o bones	0.009000	1.000	0.480
325	M	Beef-kidney	0.036000	1.000	0.480
327	M	Beef-lean (fat/free) w/o bones	0.005000	1.000	0.480
326	M	Beef-liver	0.280000	1.000	0.480
321	M	Beef-meat byproducts	0.280000	1.000	0.480
322	M	Beef-other organ meats	0.280000	1.000	0.480
20	10	Citrus citron	0.073000	1.000	1.400
330	M	Goat-fat w/o bone	0.009000	1.000	0.480
331	M	Goat-kidney	0.036000	1.000	0.480
333	M	Goat-lean (fat/free) w/o bone	0.005000	1.000	0.480
332	M	Goat-liver	0.280000	1.000	0.480
328	M	Goat-meat byproducts	0.280000	1.000	0.480
329	M	Goat-other organ meats	0.280000	1.000	0.480
23	10	Grapefruit-juice	0.008000	1.170	1.400
441	10	Grapefruit-juice-concentrate	0.008000	4.580	1.400
448	10	Grapefruit-peel	0.073000	1.000	1.400
22	10	Grapefruit-peeled fruit			
334	M	Horsemeat	0.005000	1.000	0.480
24	10	Kumquats	0.073000	1.000	1.400
28	10	Lemons-juice	0.008000	1.110	1.400
442	10	Lemons-juice-concentrate	0.008000	6.330	1.400
27	10	Lemons-peel	0.073000	1.000	1.400
26	10	Lemons-peeled fruit			
32	10	Limes-juice	0.016000	1.110	1.400
443	10	Limes-juice-concentrate	0.015000	3.330	1.400
31	10	Limes-peel	0.073000	1.000	1.400
30	10	Limes-peeled fruit			
36	10	Oranges-juice	0.003000	1.000	1.400
33	10	Oranges-juice-concentrate	0.003000	3.720	1.400
35	10	Oranges-peel	0.073000	1.000	1.400
34	10	Oranges-peeled fruit			
480	O	Plantains-green			
94	O	Plantains-ripe			
481	O	Plantains-dried	0.014000	3.900	1.000
338	M	Sheep-fat w/o bone	0.009000	1.000	0.480
339	M	Sheep-kidney	0.036000	1.000	0.480
341	M	Sheep-lean (fat free) w/o bone	0.005000	1.000	0.480
340	M	Sheep-liver	0.280000	1.000	0.480
336	M	Sheep-meat byproducts	0.280000	1.000	0.480
337	M	Sheep-other organ meats	0.280000	1.000	0.480
37	10	Tangelos	0.073000	1.000	1.400
38	10	Tangerines			
39	10	Tangerines-juice	0.009000	1.280	1.400
420	10	Tangerines-juice-concentrate	0.009000	4.080	1.400
429	M	Veal-dried	0.005000	1.920	0.480

424	M	Veal-fat w/o bones	0.009000	1.000	0.480
426	M	Veal-kidney	0.036000	1.000	0.480
425	M	Veal-lean (fat free) w/o bones	0.005000	1.000	0.480
427	M	Veal-liver	0.280000	1.000	0.480
430	M	Veal-meat byproducts	0.280000	1.000	0.480
428	M	Veal-other organ meats	0.280000	1.000	0.480
278	15	Wheat-bran	0.000300	1.000	1.000
279	15	Wheat-flour	0.000300	1.000	1.000
277	15	Wheat-germ	0.000300	1.000	1.000
437	15	Wheat-germ oil	0.000300	1.000	1.000
276	15	Wheat-rough	0.000300	1.000	1.000

#### **Attachment 4: Acute Analysis.**

U.S. Environmental Protection Agency  
7.74

Ver.

DEEM ACUTE Analysis for IMAZALIL  
data)

(1989-92

Residue file: 111901revacute.RS7  
used.

Adjustment factor #2

Analysis Date: 11-13-2001/11:47:53 Residue file dated:  
11-07-2001/13:14:25/8

NOEL (Acute) = 5.000000 mg/kg body-wt/day

Daily totals for food and foodform consumption used.

MC iterations = 5000 MC list in residue file MC seed = 10281

Run Comment: "this is a file for all the commodities with a pdp data, perce  
crop treated values and rdf files."

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Summary calculations (per capita):

Percentile	95th Percentile			99th Percentile			99.9th		
	Exposure	% aRfD	MOE	Exposure	% aRfD	MOE	Exposure	% aRfD	MOE
<hr/>									
<hr/>									
<b>U.S. Population:</b>									
0.000102	0.60	48992	0.000583	3.43	8571	0.003098	18.22		
1614									
<b>U.S. Population (spring season):</b>									
0.000107	0.63	46550	0.000607	3.57	8234	0.003418	20.11		
1462									
<b>U.S. Population (summer season):</b>									
0.000076	0.45	65883	0.000398	2.34	12572	0.001927	11.34		
2594									
<b>U.S. Population (autumn season):</b>									
0.000090	0.53	55668	0.000537	3.16	9304	0.002867	16.86		
1744									
<b>U.S. Population (winter season):</b>									
0.000140	0.82	35673	0.000808	4.75	6186	0.004129	24.29		

1210								
Northeast region:								
0.000120	0.70	41750	0.000673	3.96	7428	0.003732	21.95	
1339								
Midwest region:								
0.000095	0.56	52854	0.000475	2.79	10536	0.002635	15.50	
1897								
Southern region:								
0.000094	0.55	53448	0.000548	3.22	9125	0.002833	16.66	
1765								
Western region:								
0.000111	0.65	45052	0.000692	4.07	7226	0.003383	19.90	
1478								
Hispanics:								
0.000126	0.74	39736	0.000786	4.63	6359	0.003610	21.23	
1385								
Non-hispanic whites:								
0.000100	0.59	49929	0.000560	3.29	8935	0.003102	18.25	
1611								
Non-hispanic blacks:								
0.000093	0.54	53971	0.000576	3.39	8682	0.002606	15.33	
1918								
Non-hisp/non-white/non-black:								
0.000138	0.81	36147	0.000747	4.39	6694	0.003490	20.53	
1432								
All infants:								
0.000140	0.82	35651	0.000535	3.15	9348	0.001829	10.76	
2733								
Nursing infants (<1 yr old):								
0.000046	0.27	109302	0.000145	0.85	34595	0.001064	6.26	
4699								
Non-nursing infants (<1 yr old):								
0.000239	1.41	20922	0.000727	4.28	6877	0.002311	13.60	
2163								
Children 1-6 yrs:								
0.000218	1.28	22916	0.001181	6.95	4234	0.005790	34.06	
863								
Children 7-12 yrs:								
0.000144	0.85	34643	0.000839	4.93	5962	0.004315	25.38	
1158								
Females 13+ (preg/not nursing):								
0.000072	0.42	69407	0.000435	2.56	11496	0.002568	15.11	
1947								
Females 13+ (nursing):								
0.000162	0.95	30953	0.000794	4.67	6299	0.004635	27.26	

1078							
Females 13-19 (not preg or nursing):							
0.000063	0.37	79232	0.000417	2.45	11987	0.002228	13.11
2244							
Females 20+ (not preg or nursing):							
0.000088	0.52	56847	0.000524	3.08	9535	0.002843	16.73
1758							
Females 13-50 yrs:							
0.000070	0.41	71911	0.000449	2.64	11134	0.002503	14.73
1997							
Males 13-19 yrs:							
0.000068	0.40	73102	0.000390	2.29	12826	0.002073	12.19
2411							
Males 20+ yrs:							
0.000075	0.44	67032	0.000439	2.58	11395	0.002240	13.18
2231							
Seniors 55+:							
0.000126	0.74	39674	0.000641	3.77	7801	0.003130	18.41
1597							
Pacific:							
0.000120	0.71	41605	0.000724	4.26	6904	0.003590	21.12
1392							

**Attachment 5:      Chronic (Non-Cancer) Analysis.**

U.S. Environmental Protection Agency  
DEEM Chronic analysis for IMAZALIL

Residue file name: C:\deem\111901\111901revchronic.RS7

Ver. 7  
(1989-92 da  
Adjustment factor #2  
used.

Analysis Date 11-13-2001/10:12:36  
11-13-2001/10:07:21/8

Residue file dated:

Reference dose (RfD, Chronic) = .0025 mg/kg bw/day

COMMENT 1: this is a file for all the commodities with a pdp data, percent crop treated values and rdf files.

=====

=

Total exposure by population subgroup

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-

Population Subgroup	Total Exposure	
	mg/kg body wt/day	Percent of Rfd
U.S. Population (total)	0.000034	1.3%
U.S. Population (spring season)	0.000036	1.5%
U.S. Population (summer season)	0.000023	0.9%
U.S. Population (autumn season)	0.000031	1.2%
U.S. Population (winter season)	0.000045	1.8%
Northeast region	0.000039	1.6%
Midwest region	0.000029	1.2%
Southern region	0.000031	1.3%
Western region	0.000037	1.5%
Hispanics	0.000040	1.6%
Non-hispanic whites	0.000033	1.3%
Non-hispanic blacks	0.000029	1.2%
Non-hisp/non-white/non-black	0.000041	1.6%
All infants (< 1 year)	0.000028	1.1%
Nursing infants	0.000015	0.6%
Non-nursing infants	0.000033	1.3%
Children 1-6 yrs	0.000069	2.7%
Children 7-12 yrs	0.000048	1.9%
Females 13-19 (not preg or nursing)	0.000024	0.9%
Females 20+ (not preg or nursing)	0.000030	1.2%
Females 13-50 yrs	0.000026	1.0%
Females 13+ (preg/not nursing)	0.000027	1.1%
Females 13+ (nursing)	0.000047	1.9%

Males 13-19 yrs	0.000024	1.0%
Males 20+ yrs	0.000026	1.0%
Seniors 55+	0.000037	1.5%
Pacific Region	0.000039	1.6%

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-

#### **Attachment 6: Chronic (Cancer) Analysis.**

U.S. Environmental Protection Agency  
DEEM Chronic analysis for IMAZALIL  
Residue file name: C:\deem\111901\111901revcancer.RS7

Ver. 7  
(1989-92 da

Adjustment factor #2

used.

Analysis Date 11-13-2001/10:11:45 Residue file dated:

11-13-2001/10:05:14/8

Q\* = 0.0611

COMMENT 1: this is a file for all the commodities with a pdp data, percent crop treated values and rdf files.

=====

Total exposure by population subgroup

-

Population Subgroup	mg/kg body wt/day	Lifetime risk (Q* = .0611)
U.S. Population (total)	0.000034	2.05E-06

With zeroes inserted for the ½ LODs in Bananas.

U.S. Environmental Protection Agency

Ver. 7

DEEM Chronic analysis for IMAZALIL

(1989-92 da

Residue file name: C:\deem\111901\111901revcancerwzeroesforbananas.RS7

Adjustment factor #2

used.

Analysis Date 11-13-2001/10:13:52

Residue file dated:

11-13-2001/10:09:53/8

Q\* = 0.0611

COMMENT 1: this is a file for all the commodities with a pdp data, percent crop treated values and rdf files and inserting zeroes for 1/2 LODs in bananas.

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Total exposure by population subgroup

-

		Total Exposure
Population Subgroup	mg/kg body wt/day	Lifetime risk (Q* = .0611)
U.S. Population (total)	0.000032	1.94E-06

With zeroes inserted for the ½ LODs in Bananas and zero for meat and fat.

U.S. Environmental Protection Agency

Ver. 7

DEEM Chronic analysis for IMAZALIL

(1989-92 da

Residue file name:

C:\deem\111901\111901revcancerwzeroesforbananaszeroformeatfat.RS7

Adjustment factor #2

used.

Analysis Date 11-13-2001/10:14:59

Residue file dated:

11-13-2001/10:10:51/8

Q\* = 0.0611

COMMENT 1: this is a file for all the commodities with a pdp data, percent crop treated values, inserting zeroes for 1/2 LODs in bananas and inserting zero for meat and fat.

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Total exposure by population subgroup

Population Subgroup	Total Exposure	
	mg/kg body wt/day	Lifetime risk (Q* = .0611)
U.S. Population (total)	0.000029	1.78E-06

### **Attachment 7: Acute Critical Exposure Contribution Analysis.**

U.S. Environmental Protection Agency  
DEEM Acute Critical Exposure Contribution Analysis (Ver 7.74)  
CSFII 1989-92

Residue file = C:\deem\111901\111901revacute.RS7  
Acute report = C:\deem\111901\111901revacute.AC7  
Date and time of analysis: 11-13-2001 09:57:33  
Daily totals for food and foodform consumption used.  
Adjustment factor #2 used.  
Minimum exposure contribution = 1%  
Monte Carlo Iterations = 5000 Seed = 10281  
CEC records generated for first 559 iterations.  
Exposures divided by body weight

#### Subpopulations:

- 1 U.S. Population
- 2 U.S. Population (spring season)
- 3 U.S. Population (summer season)
- 4 U.S. Population (autumn season)
- 5 U.S. Population (winter season)
- 6 Northeast region
- 7 Midwest region
- 8 Southern region
- 9 Western region
- 10 Hispanics
- 11 Non-hispanic whites
- 12 Non-hispanic blacks
- 13 Non-hisp/non-white/non-black
- 14 All infants
- 15 Nursing infants (<1 yr old)
- 16 Non-nursing infants (<1 yr old)
- 17 Children 1-6 yrs

18 Children 7-12 yrs  
19 Females 13+ (preg/not nursing)  
20 Females 13+ (nursing)  
21 Females 13-19 (not preg or nursing)  
22 Females 20+ (not preg or nursing)  
23 Females 13-50 yrs  
24 Males 13-19 yrs  
25 Males 20+ yrs  
26 Seniors 55+  
27 Pacific

=====

==

U.S. Population

Low percentile for CEC records: 99.9      Exposure (mg/day) =      0.003098  
High percentile for CEC records: 100      Exposure (mg/day) =      0.149522  
Number of actual records in this interval: 17384

Critical foods/foodforms for this population (as derived from these records)

N=number of appearances in all records (including duplicates)

%=percent of total exposure for all records (including duplicates)

Food	FF	N	Percent	Food Name
----	--	-----	-----	-----
34	11	9820	58.19%	Oranges-peeled fruit-Uncooked
22	11	5110	29.22%	Grapefruit-peeled fruit-Uncooked
33	11	1139	4.14%	Oranges-juice-concentrate-Uncooked
33	41	903	3.35%	Oranges-juice-concentrate-Frozen: NFS
38	11	361	1.76%	Tangerines-Uncooked

=====

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All infants

Low percentile for CEC records: 99.9      Exposure (mg/day) =      0.001829  
High percentile for CEC records: 100      Exposure (mg/day) =      0.066597  
Number of actual records in this interval: 296

Critical foods/foodforms for this population (as derived from these records)

N=number of appearances in all records (including duplicates)

%=percent of total exposure for all records (including duplicates)

Food	FF	N	Percent	Food Name
----	--	-----	-----	-----

33	31	128	64.22%	Oranges-juice-concentrate-Canned: NFS
33	11	83	18.38%	Oranges-juice-concentrate-Uncooked
72	31	65	10.73%	Bananas-Canned: NFS
33	41	23	5.76%	Oranges-juice-concentrate-Frozen: NFS

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Children 1-6 yrs

Low percentile for CEC records: 99.9      Exposure (mg/day) =      0.005790

High percentile for CEC records: 100      Exposure (mg/day) =      0.149522

Number of actual records in this interval: 1818

Critical foods/foodforms for this population (as derived from these records)

N=number of appearances in all records (including duplicates)

%=percent of total exposure for all records (including duplicates)

Food	FF	N	Percent	Food Name
---	--	-----	-----	-----
34	11	1284	76.24%	Oranges-peeled fruit-Uncooked
22	11	187	10.10%	Grapefruit-peeled fruit-Uncooked
33	11	162	5.40%	Oranges-juice-concentrate-Uncooked
33	41	121	4.13%	Oranges-juice-concentrate-Frozen: NFS
38	11	54	2.31%	Tangerines-Uncooked

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Children 7-12 yrs

Low percentile for CEC records: 99.9      Exposure (mg/day) =      0.004315

High percentile for CEC records: 100      Exposure (mg/day) =      0.056012

Number of actual records in this interval: 1287

Critical foods/foodforms for this population (as derived from these records)

N=number of appearances in all records (including duplicates)

%=percent of total exposure for all records (including duplicates)

Food	FF	N	Percent	Food Name
---	--	-----	-----	-----
34	11	926	71.31%	Oranges-peeled fruit-Uncooked
22	11	246	19.06%	Grapefruit-peeled fruit-Uncooked
38	11	48	3.01%	Tangerines-Uncooked
33	41	56	2.70%	Oranges-juice-concentrate-Frozen: NFS
33	11	54	2.40%	Oranges-juice-concentrate-Uncooked

=====

==

Females 13-50 yrs

Low percentile for CEC records: 99.9      Exposure (mg/day) =      0.002503  
 High percentile for CEC records: 100      Exposure (mg/day) =      0.063075  
 Number of actual records in this interval: 4840

Critical foods/foodforms for this population (as derived from these records)  
 N=number of appearances in all records (including duplicates)  
 %=percent of total exposure for all records (including duplicates)

Food	FF	N	Percent	Food Name
---	--	-----	-----	-----
34	11	2858	59.13%	Oranges-peeled fruit-Uncooked
22	11	1599	34.40%	Grapefruit-peeled fruit-Uncooked
33	11	160	1.76%	Oranges-juice-concentrate-Uncooked
33	41	163	1.60%	Oranges-juice-concentrate-Frozen: NFS
38	11	88	1.51%	Tangerines-Uncooked

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Males 13-19 yrs

Low percentile for CEC records: 99.9      Exposure (mg/day) =      0.002073  
 High percentile for CEC records: 100      Exposure (mg/day) =      0.039350  
 Number of actual records in this interval: 595

Critical foods/foodforms for this population (as derived from these records)  
 N=number of appearances in all records (including duplicates)  
 %=percent of total exposure for all records (including duplicates)

Food	FF	N	Percent	Food Name
---	--	-----	-----	-----
34	11	419	73.49%	Oranges-peeled fruit-Uncooked
22	11	54	10.91%	Grapefruit-peeled fruit-Uncooked
33	11	46	4.85%	Oranges-juice-concentrate-Uncooked
33	41	38	3.82%	Oranges-juice-concentrate-Frozen: NFS
38	11	22	3.58%	Tangerines-Uncooked
36	11	20	1.86%	Oranges-juice-Uncooked
442	41	15	1.16%	Lemons-juice-concentrate-Frozen: NFS

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Males 20+ yrs

Low percentile for CEC records: 99.9      Exposure (mg/day) =      0.002240  
 High percentile for CEC records: 100      Exposure (mg/day) =      0.096536  
 Number of actual records in this interval: 4650

Critical foods/foodforms for this population (as derived from these records)  
 N=number of appearances in all records (including duplicates)  
 %=percent of total exposure for all records (including duplicates)

Food	FF	N	Percent	Food Name
22	11	2197	48.84%	Grapefruit-peeled fruit-Uncooked
34	11	2219	45.10%	Oranges-peeled fruit-Uncooked
33	11	136	1.53%	Oranges-juice-concentrate-Uncooked
38	11	64	1.13%	Tangerines-Uncooked

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Seniors 55+

Low percentile for CEC records: 99.9      Exposure (mg/day) =      0.003130  
 High percentile for CEC records: 100      Exposure (mg/day) =      0.079377  
 Number of actual records in this interval: 4073

Critical foods/foodforms for this population (as derived from these records)  
 N=number of appearances in all records (including duplicates)  
 %=percent of total exposure for all records (including duplicates)

Food	FF	N	Percent	Food Name
22	11	2132	51.85%	Grapefruit-peeled fruit-Uncooked
34	11	2010	46.44%	Oranges-peeled fruit-Uncooked

#### **Attachment 8: Chronic Critical Commodity Contribution Analysis.**

U.S. Environmental Protection Agency  
 DEEM Chronic analysis for IMAZALIL  
 Residue file name: C:\deem\111901\111901revchronic.RS7

Ver. 7  
(1989-92 da

Adjustment factor #2

used.

Analysis Date 11-13-2001/10:12:39 Residue file dated:  
11-13-2001/10:07:21/8

Reference dose (RfD, Chronic) = .0025 mg/kg bw/day

COMMENT 1: this is a file for all the commodities with a pdp data, percent crop treated values and rdf files.

=====

= Critical Commodity Contribution Analysis for  
U.S. Population (total)

Total Exposure = .0000336 mg/kg bw/day

Crop groups with total exposure contribution > 5%  
Foods/Foodforms with exposure contribution > 2%

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Crop group Food Foodform	-----Exposure Analysis-----		
	mg/kg body wt/day	% of Total Exposure	Percent of RfD
<hr/>			
Crop Group = (0) Other			
Bananas			
Uncooked	0.0000036	10.70%	0.14%
Total for crop group	0.0000042	12.52%	0.17%
<hr/>			
Crop Group = (M) Meat			
Beef-meat byproducts	0.0000013	3.99%	0.05%
Beef-fat w/o bones	0.0000008	2.29%	0.03%
Beef-lean (fat/free) w/o bones	0.0000018	5.43%	0.07%
Total for crop group	0.0000051	15.13%	0.20%
<hr/>			
Crop Group = (10) Citrus Fruits			
Grapefruit-peeled fruit			
Uncooked	0.0000060	17.98%	0.24%
Grapefruit-juice	0.0000008	2.49%	0.03%
Oranges-juice-concentrate	0.0000037	11.03%	0.15%
Oranges-peeled fruit			
Uncooked	0.0000100	29.66%	0.40%
Oranges-juice	0.0000010	2.98%	0.04%
Lemons-juice-concentrate	0.0000009	2.79%	0.04%

Total for crop group	0.0000238	70.98%	0.95%
Total for crop groups listed above:	0.0000331	98.63%	1.3%

-  
=====

Critical Commodity Contribution Analysis for  
All infants (< 1 year)

Total Exposure = .0000279 mg/kg bw/day

Crop groups with total exposure contribution > 5%  
Foods/Foodforms with exposure contribution > 2%

Crop group	Exposure Analysis		
Food	mg/kg body wt/day	% of Total Exposure	Percent of RfD
Foodform			
Crop Group = (O) Other			
Bananas			
Uncooked	0.0000017	6.23%	0.07%
Canned: NFS	0.0000154	55.19%	0.62%
Canned: Cooked	0.0000007	2.35%	0.03%
Bananas-dried	0.0000028	9.97%	0.11%
Bananas-juice	0.0000006	2.06%	0.02%
Total for crop group	0.0000212	76.15%	0.85%
Crop Group = (M) Meat			
Beef-lean (fat/free) w/o bones	0.0000008	2.90%	0.03%
Total for crop group	0.0000013	4.59%	0.05%
Crop Group = (10) Citrus Fruits			
Oranges-juice-concentrate	0.0000051	18.18%	0.20%
Total for crop group	0.0000052	18.69%	0.21%

Total for crop groups listed above: 0.0000277 99.43% 1.1%

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Critical Commodity Contribution Analysis for  
Children 1-6 yrs

Total Exposure = .0000687 mg/kg bw/day

Crop groups with total exposure contribution > 5%  
Foods/Foodforms with exposure contribution > 2%

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Crop group	Exposure Analysis		
	Food	mg/kg body wt/day	% of Total Exposure
Foodform			
-----	-----	-----	-----

Crop Group = (O) Other

Bananas

Uncooked

0.0000103

14.95%

0.41%

-----

Total for crop group

0.0000116

16.94%

0.47%

Crop Group = (M) Meat

Beef-meat byproducts

0.0000041

5.98%

0.16%

Beef-fat w/o bones

0.0000017

2.41%

0.07%

Beef-lean (fat/free) w/o bones

0.0000034

5.00%

0.14%

-----

Total for crop group

0.0000105

15.25%

0.42%

Crop Group = (10) Citrus Fruits

Grapefruit-peeled fruit

Uncooked

0.0000032

4.62%

0.13%

Oranges-juice-concentrate

0.0000102

14.86%

0.41%

Oranges-peeled fruit

Uncooked

0.0000246

35.88%

0.99%

Oranges-juice

Uncooked

0.0000032

4.70%

0.13%

Tangerines

Uncooked

0.0000014

2.09%

0.06%

Lemons-juice-concentrate

0.0000016

2.30%

0.06%

Total for crop group	0.0000455	66.32%	1.82%
Total for crop groups listed above:	0.0000676	98.52%	2.7%

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Critical Commodity Contribution Analysis for  
Children 7-12 yrs

Total Exposure = .0000481 mg/kg bw/day

Crop groups with total exposure contribution > 5%  
Foods/Foodforms with exposure contribution > 2%

-

Crop group Food Foodform	Exposure Analysis		
	mg/kg body wt/day	% of Total Exposure	Percent of RfD

-

Crop Group = (O) Other

Bananas

Uncooked	0.0000042	8.77%	0.17%
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Total for crop group

0.0000047	9.66%	0.19%
-----------	-------	-------

Crop Group = (M) Meat

Beef-meat byproducts

0.0000023	4.71%	0.09%
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Beef-fat w/o bones

0.0000012	2.42%	0.05%
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Beef-lean (fat/free) w/o bones

0.0000025	5.26%	0.10%
-----------	-------	-------

Total for crop group

0.0000067	14.00%	0.27%
-----------	--------	-------

Crop Group = (10) Citrus Fruits

Grapefruit-peeled fruit

Uncooked	0.0000041	8.60%	0.17%
----------	-----------	-------	-------

Grapefruit-juice

0.0000011	2.25%	0.04%
-----------	-------	-------

Oranges-juice-concentrate

0.0000061	12.65%	0.24%
-----------	--------	-------

Oranges-peeled fruit

Uncooked	0.0000198	41.08%	0.79%
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Oranges-juice

0.0000013	2.70%	0.05%
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Lemons-juice-concentrate	0.0000024	4.97%	0.10%
Total for crop group	0.0000360	74.85%	1.44%
Total for crop groups listed above:	0.0000474	98.52%	1.9%

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Critical Commodity Contribution Analysis for  
Females 13-50 yrs

Total Exposure = .000026 mg/kg bw/day

Crop groups with total exposure contribution > 5%  
Foods/Foodforms with exposure contribution > 2%

Crop group	Exposure Analysis		
Food	mg/kg body wt/day	% of Total Exposure	Percent of RfD
Foodform			
Crop Group = (O) Other			
Bananas			
Uncooked	0.0000023	8.86%	0.09%
Total for crop group	0.0000025	9.70%	0.10%
Crop Group = (M) Meat			
Beef-meat byproducts	0.0000008	2.92%	0.03%
Beef-fat w/o bones	0.0000006	2.25%	0.02%
Beef-lean (fat/free) w/o bones	0.0000014	5.55%	0.06%
Total for crop group	0.0000036	13.71%	0.14%
Crop Group = (10) Citrus Fruits			
Grapefruit-peeled fruit			
Uncooked	0.0000047	18.22%	0.19%
Grapefruit-juice	0.0000008	2.88%	0.03%
Oranges-juice-concentrate	0.0000029	11.12%	0.12%
Oranges-peeled fruit			
Uncooked	0.0000081	31.18%	0.32%

Oranges-juice	0.0000007	2.63%	0.03%
Lemons-juice-concentrate	0.0000009	3.64%	0.04%
-----	-----	-----	-----
Total for crop group	0.0000196	75.21%	0.78%
Total for crop groups listed above:	0.0000256	98.62%	1.0%
-----	-----	-----	-----
-			

## Critical Commodity Contribution Analysis for Males 13-19 yrs

Total Exposure = .0000241 mg/kg bw/day

Crop groups with total exposure contribution > 5%  
Foods/Foodforms with exposure contribution > 2%

Crop group	Exposure Analysis		
Food	mg/kg body wt/day	% of Total Exposure	Percent of RfD
Foodform			
<hr/>			
Crop Group = (O) Other			
Bananas			
Uncooked	0.0000026	10.85%	0.10%
<hr/>			
Total for crop group	0.0000031	12.75%	0.12%
<hr/>			
Crop Group = (M) Meat			
Beef-meat byproducts	0.0000012	5.03%	0.05%
Beef-fat w/o bones	0.0000010	4.18%	0.04%
Beef-lean (fat/free) w/o bones	0.0000022	9.17%	0.09%
<hr/>			
Total for crop group	0.0000048	19.72%	0.19%
<hr/>			
Crop Group = (10) Citrus Fruits			
Oranges-juice-concentrate	0.0000035	14.66%	0.14%
Oranges-peeled fruit			
Uncooked	0.0000079	32.76%	0.32%
Oranges-juice	0.0000013	5.28%	0.05%
Tangerines			
Uncooked	0.0000010	4.07%	0.04%

Lemons-juice-concentrate	0.0000011	4.61%	0.04%
Total for crop group	0.0000158	65.45%	0.63%
Total for crop groups listed above:	0.0000236	97.91%	0.9%

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=====

Critical Commodity Contribution Analysis for  
Males 20+ yrs

Total Exposure = .000026 mg/kg bw/day

Crop groups with total exposure contribution > 5%  
Foods/Foodforms with exposure contribution > 2%

Crop group	Exposure Analysis		
Food	mg/kg body wt/day	% of Total Exposure	Percent of RFD
Foodform			

Crop Group = (O) Other

Bananas			
Uncooked	0.0000024	9.26%	0.10%
Total for crop group	0.0000026	9.91%	0.10%

Crop Group = (M) Meat

Beef-meat byproducts	0.0000012	4.67%	0.05%
Beef-other organ meats	0.0000006	2.35%	0.02%
Beef-fat w/o bones	0.0000007	2.66%	0.03%
Beef-liver	0.0000009	3.51%	0.04%
Beef-lean (fat/free) w/o bones	0.0000018	6.75%	0.07%
Total for crop group	0.0000053	20.21%	0.21%

Crop Group = (10) Citrus Fruits

Grapefruit-peeled fruit			
Uncooked	0.0000069	26.47%	0.28%
Grapefruit-juice	0.0000011	4.13%	0.04%
Oranges-juice-concentrate	0.0000023	8.93%	0.09%

Oranges-peeled fruit			
Uncooked	0.0000053	20.25%	0.21%
Oranges-juice	0.0000006	2.16%	0.02%
Lemons-juice-concentrate	0.0000006	2.23%	0.02%
<hr/>			
Total for crop group	0.0000178	68.36%	0.71%
Total for crop groups listed above:	0.0000256	98.48%	1.0%
<hr/>			
-			
<hr/>			
=			

# Critical Commodity Contribution Analysis for Seniors 55+

Total Exposure = .0000368 mg/kg bw/day

Crop groups with total exposure contribution > 5%  
Foods/Foodforms with exposure contribution > 2%

Crop group	Food	Foodform	Exposure Analysis		
			mg/kg body wt/day	% of Total Exposure	Percent of RfD
<hr/>					
Crop Group = (O) Other					
Bananas					
Uncooked			0.0000045	12.24%	0.18%
Total for crop group			0.0000046	12.60%	0.19%
Crop Group = (M) Meat					
Beef-liver			0.0000014	3.80%	0.06%
Beef-lean (fat/free) w/o bones			0.0000013	3.47%	0.05%
Total for crop group			0.0000043	11.59%	0.17%
Crop Group = (10) Citrus Fruits					
Grapefruit-peeled fruit					
Uncooked			0.0000115	31.20%	0.46%
Grapefruit-juice			0.0000016	4.29%	0.06%
Oranges-juice-concentrate			0.0000027	7.35%	0.11%
Oranges-peeled fruit					

Uncooked	0.0000092	25.00%	0.37%
Oranges-juice	0.0000008	2.21%	0.03%
<hr/>			
Total for crop group	0.0000276	74.97%	1.10%
<hr/>			
Total for crop groups listed above:	0.0000365	99.16%	1.5%
<hr/>			
-			

## **Attachment 9:      Cancer Critical Commodity Contribution Analysis.**

U.S. Environmental Protection Agency  
DEEM Chronic analysis for IMAZALIL  
Residue file name: C:\deem\111901\111901revcancer.RS7

Ver. 7  
(1989-92 da

Adjustment factor #2  
used.

Analysis Date 11-13-2001/10:11:48      Residue file dated:  
11-13-2001/10:05:14/8

Q\* = 0.0611

COMMENT 1: this is a file for all the commodities with a pdp data, percent  
crop treated values and rdf files.

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### Critical Commodity Contribution Analysis for U.S. Population (total)

Total Exposure = .0000336 mg/kg bw/day

Crop groups with total exposure contribution > 5%  
Foods/Foodforms with exposure contribution > 2%

Crop group analysis-----		Exposure		
Food Risk	Foodform	mg/kg body wt/day	% of Total	Lifetime Exposure   (Q*= .0611
Crop Group = (O) Other				
Bananas				
Uncooked		0.0000036	10.70%	2.19E
Total for crop group		0.0000042	12.52%	2.57E
Crop Group = (M) Meat				
Beef-meat byproducts		0.0000013	3.99%	8.19E
Beef-fat w/o bones		0.0000008	2.29%	4.71E
Beef-lean (fat/free) w/o bones		0.0000018	5.43%	1.11E

Total for crop group		0.0000051	15.13%	3.10E
Crop Group = (10) Citrus Fruits				
Grapefruit-peeled fruit				
Uncooked		0.0000060	17.98%	3.69E
Grapefruit-juice		0.0000008	2.49%	5.11E
Oranges-juice-concentrate		0.0000037	11.03%	2.26E
Oranges-peeled fruit				
Uncooked		0.0000100	29.66%	6.09E
Oranges-juice		0.0000010	2.98%	6.11E
Lemons-juice-concentrate		0.0000009	2.79%	5.73E
Total for crop group		0.0000238	70.98%	1.46E
Total for crop groups listed above:		0.0000331	98.63%	2.02E

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With zeroes inserted for the ½ LODs in Bananas.

U.S. Environmental Protection Agency  
DEEM Chronic analysis for IMAZALIL  
Residue file name: C:\deem\111901\111901revcancerwzeroesforbananas.RS7

Ver. 7  
(1989-92 da  
Adjustment factor #2  
used.

Analysis Date 11-13-2001/10:13:56      Residue file dated:  
11-13-2001/10:09:53/8

Q\* = 0.0611

COMMENT 1: this is a file for all the commodities with a pdp data, percent crop treated values and rdf files and inserting zeroes for 1/2 LODs in bananas.

=

Critical Commodity Contribution Analysis for  
U.S. Population (total)

Total Exposure = .0000318 mg/kg bw/day

Crop groups with total exposure contribution > 5%  
Foods/Foodforms with exposure contribution > 2%

Crop group analysis-----		Exposure		
Food Risk	Foodform	mg/kg	% of Total	Lifetime
		body wt/day	Exposure	(Q* = .0611)
Crop Group = (O) Other				
Bananas				
Uncooked		0.0000021	6.46%	1.25E
Total for crop group		0.0000024	7.56%	1.47E
Crop Group = (M) Meat				
Beef-meat byproducts		0.0000013	4.22%	8.19E
Beef-fat w/o bones		0.0000008	2.42%	4.71E
Beef-lean (fat/free) w/o bones		0.0000018	5.74%	1.11E
Total for crop group		0.0000051	15.99%	3.10E
Crop Group = (10) Citrus Fruits				
Grapefruit-peeled fruit				
Uncooked		0.0000060	19.00%	3.69E
Grapefruit-juice		0.0000008	2.63%	5.11E
Oranges-juice-concentrate		0.0000037	11.65%	2.26E
Oranges-peeled fruit				
Uncooked		0.0000100	31.34%	6.09E
Oranges-juice		0.0000010	3.14%	6.11E
Lemons-juice-concentrate		0.0000009	2.95%	5.73E
Total for crop group		0.0000238	75.00%	1.46E
Total for crop groups listed above:		0.0000313	98.55%	1.91E

With zeroes inserted for the ½ LODs in Bananas and zero for meat and fat.

U.S. Environmental Protection Agency  
DEEM Chronic analysis for IMAZALIL  
Residue file name:  
C:\deem\111901\111901revcancerwzeroesforbananaszeroesformeatfat.RS7

Ver. 7  
(1989-92 da

Adjustment factor #2

used.

Analysis Date 11-13-2001/10:15:02 Residue file dated:  
11-13-2001/10:10:51/8

Q\* = 0.0611

COMMENT 1: this is a file for all the commodities with a pdp data, percent crop treated values, inserting zeroes for 1/2 LODs in bananas and inserting zero for meat and fat.

=

Critical Commodity Contribution Analysis for  
U.S. Population (total)

Total Exposure = .0000291 mg/kg bw/day

Crop groups with total exposure contribution > 5%  
Foods/Foodforms with exposure contribution > 2%

Crop group

analysis-----

Food  
Risk

Foodform

-----Exposure

mg/kg | % of Total | Lifetime

body wt/day | Exposure | (Q\*= .0611)

Crop Group = (O) Other

Bananas

Uncooked

0.0000021

7.04%

1.25E

Total for crop group

0.0000024

8.24%

1.47E

Crop Group = (M) Meat

Beef-meat byproducts

0.0000013

4.60%

8.19E

Beef-liver

0.0000006

2.05%

3.64E

Total for crop group

0.0000024

8.36%

1.49E

Crop Group = (10) Citrus Fruits

Grapefruit-peeled fruit

    Uncooked                           0.0000060   20.73%   3.69E

Grapefruit-juice                   0.0000008   2.87%   5.11E

Oranges-juice-concentrate       0.0000037   12.71%   2.26E

Oranges-peeled fruit

    Uncooked                           0.0000100   34.19%   6.09E

Oranges-juice                     0.0000010   3.43%   6.11E

Lemons-juice-concentrate       0.0000009   3.22%   5.73E

-----|-----|-----

Total for crop group            0.0000238   81.81%   1.46E

Total for crop groups listed above:   0.0000287   98.42%   1.75E

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